

The **TEC**

DEPARTMENT

CHEMICAL AGE

TECHNOLOGY DEPARTMENT

OL LX

19 MARCH 1949

No 1549

**SEND YOUR
INDUSTRIAL
AND TRADE
ENQUIRIES
TO**

HULL

**BRITAIN'S
CHEAPEST PORT**

**OILS, PAINTS, CHEMICALS
HOUSEHOLD & PHARMACEUTICAL
PRODUCTS, FOOD PRODUCTION
GENERAL ENGINEERING ETC.**



TRADE & INDUSTRIAL ENQUIRIES

Town Clerk, Kingston upon Hull

1 CWT. KEGS —7 DAY DELIVERY—

COOPERED IRON HOOPED
KEGS SUITABLE FOR DRY
MATERIALS MEASURING
13" X 22"

DESIGNED AND MANUFACTURED
BY US SPECIALLY FOR THE
HOME & EXPORT CHEMICAL
TRADES.

Sample on request

GEO. W. ORR & Co. Ltd.
8 COUSTONHOLM ROAD,
GLASGOW, S.3.

Telegrams: Containers, Glasgow. Telephone: Langeside, 1777.

ACIDS

★ NEW BUYERS
ESPECIALLY INVITED

- METAL FINISHING
NITRIC, HYDROCHLORIC, SUL-
PHURIC, DIPPING ACIDS & SUNDRY
CHEMICALS
- PROCESS ENGRAVING
NITRIC ACID, IRON PERCHLORIDE
(LIQUID OR SOLID) SUNDRY
CHEMICALS
- GARAGES, ETC.
ACCUMULATOR ACIDS (ALL
STRENGTHS) DISTILLED WATER

GEO. F. BOOME & SON LTD.

STAR CHEMICAL WORKS
WATTS GROVE, BOW, E.3
PHONE EAST 2264-5

BROWNS

FOUNDRY Co. Ltd.

Nottingham Rd.

DERBY

Est. 1868

CHEMICAL

PLANT

TO

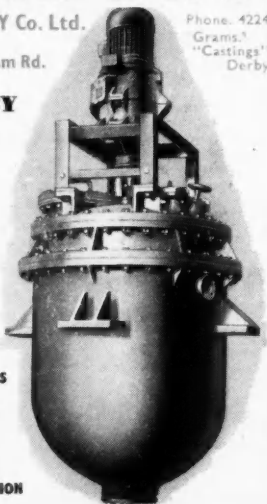
SUIT

CUSTOMERS

DESIGNS

AND

SPECIFICATION



Phone. 4224
Grams.
"Castings"
Derby

PUMPS

● FOR ALL PURPOSES ●

Centrifugal and Diaphragm
1½" to 4" dia.

PETROL, ELECTRIC OR HANDPOWER
NEW AND RECONDITIONED.
SALE OR HIRE.

RING GREENWICH 3189

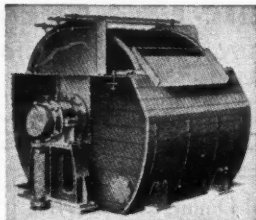
THE
**GREENWICH PUMP
& PLANT CO., LTD.**

DENHAM ST., GREENWICH S.E.10

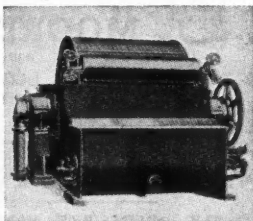


Plant for the Chemical Industry

for ACID NEUTRALIZATION, CLARIFICATION OF LIQUIDS, DEWATERING OF SLUDGES, EFFLUENT PURIFICATION, FILTRATION AND FLOCCULATION, PICKLING LIQUOR TREATMENT, PURIFICATION OF TRADE WASTE, SEDIMENTATION AND THICKENING, SEPARATION OF SOLIDS FROM LIQUIDS, SODA RECOVERY. WET MATERIAL HANDLING



Rotary Pulp Washing Machine, with Pitch Pine Trough, Wash Gear and Scraper Knife.



Rotary Vacuum Filter, with Take-off Roller and Repulper.

including
AGITATORS CAUSTICIZERS, CLARIFIERS, CLASSIFIERS, CONVEYORS, DEWATERING MACHINES, ROTARY, VACUUM FILTERS, SAND WASHERS, SLUDGE PUMPS, THICKENERS, etc.

UNIFLOC REAGENTS LTD.,
— SWANSEA —

Phone : Swansea 5164
(3 lines)

Grams : Unifloc, Swansea

To meet **COMPETITION** from **IMPORTED BARYTES**

we have substantially

REDUCED PRICES

For Our Finely Ground

ALL ENGLISH ORIGIN BARYTES

Prompt Delivery

Support Independent Producers who gave good service during times of scarcity.

Athole G. Allen (Stockton) Ltd.

STOCKTON-ON-TEES, CO. DURHAM

Safety First

SAFETY DEPENDS

not only on the care and skill of the operative, but on the quality and design of the apparatus he uses. We have specialised for nearly a hundred years in the design, construction and development of **LIFTING APPLIANCES**

W. & E. MOORE LTD.

(The Lifting Gear People)

13/31, POPLAR HIGH ST., LONDON, E.14

East 2613 (4 lines)

Etab. 1863

SAFETY FIRST

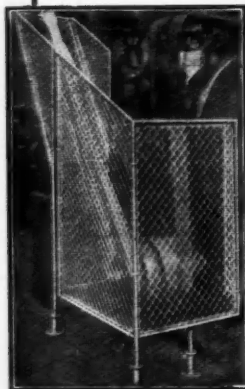
THE "OLDBURY" PATENT CARBOY DISCHARGER

will empty and elevate up to 50 feet the contents of any carboy, bottle or vessel, and complies with all the conditions of the Factory Act of 1937.

KESTNER'S

5, Grosvenor Gardens, Westminster, London, S.W.

POTTER'S Machinery Guards



- DESIGNED FOR SAFETY
- BUILT FOR SERVICE

Potter's guards are installed in works throughout the country and are distinguishable by their sound construction, good fitting and many exclusive features.

F.W. POTTER & SOAR LTD.

PHIPP STREET, LONDON, E.C.2
Telephones: 8584 (4 lines)

BELTING

AND

ENDLESS VEE ROPES

Superlative Quality

Large Stocks - Prompt Despatch

FRANCIS W. HARRIS & Co. Ltd.

BURSLEM - Stoke-on-Trent

'Phone : Stoke-on-Trent 87161-2

'Grams : Belting, Burslem

First Aid Outfits, etc., complying with Factory Regulations.
Factory Thermometers, etc.

FIRST AID SUPPLY CO. 1925

88, NEWINGTON BUTTS, LONDON, S.E.11

Telephone : RELiance 1823



**I
CERTAINLY
FEEL A
LOT SAFER
NOW!**

The psychological feeling of confidence given by correct protective aprons, clogs, boots, clothing, etc., has been found to have a very considerable effect on production per man hour in many jobs. Send us full details of your requirements and we shall be happy to send you our recommendations and prices.

WALLACH BROS. Ltd

49, TABERNACLE ST. LONDON, E.C.2 CLE 1448/9
W 11

INDEX TO ADVERTISERS IN THIS ISSUE

	Page		Page
Allen, Athole G. (Stockton), Ltd.	i	Imperial Chemical Industries, Ltd.	ix & xviii
Alumina Co., Ltd., The	xii	Imperial Smelting Corporation, Ltd.	xi
Baker Perkins, Ltd.	iv	Iodine Educational Bureau, The	viii
Blackwell's Metallurgical Works, Ltd.	xxvi	Jenkinson, W. G., Ltd.	438
Bolton & Hayes, Ltd.	Cover iii	Kestner Evaporator & Engineering Co., Ltd. ii & xii	
Boome, Geo. F., & Son, Ltd.	Cover ii	Kilner, John, & Son (1927), Ltd.	438
Braby, Fredk., & Co., Ltd.	xvi	Laporte Chemicals, Ltd.	iii
British Railways, The	x	Lennox Foundry Co., Ltd.	xxvi
British Steam Specialties, Ltd.	438	Lord, John L.	Cover iv
Browns Foundry Co., Ltd.	Cover ii	Mirvale Chemical Co., Ltd.	xxvi
Callow Rock Lime Co., Ltd., The	Cover iii	Monsanto Chemicals, Ltd.	vii
Castle Engineering Co. (Nott.), Ltd., The	Cover iv	Moore, W. & E., Ltd.	ii
Chance Brothers, Ltd.	xix	Nordac, Ltd.	xx
Chemical Engineering & Wilton's Patent Furnace Co., Ltd., The	vi	Northern Glass & Instruments, Ltd.	vi
Classified Advertisements ...xxii, xxiii, xxi / & xxv		Organic Dyestuffs, Ltd.	xii
Collacott, R. A., & Partners	xxvi	Orr, Geo. W., & Co., Ltd.	Cover ii
Cox Brothers & Co. (Derby), Ltd.	xxvi	Paget, Dr. R. F.	xxiii
Dunlop Rubber Co., Ltd.	xv	Potter, F. W., & Soar, Ltd.	ii
Elliott, H. J., Ltd.	xiv	Prodorite, Ltd.	Cover iii
Essex Aero, Ltd.	xvii	Pulsometer Engineering Co., Ltd.	xx
Farnell Carbons, Ltd.	xxvi	Reads, Ltd.	v
First Aid Supply Co.	ii	Spencer Chapman & Messel, Ltd.	xiv
Foster Yates & Thom, Ltd.	x	Tanks & Linings, Ltd.	xiii
Greenwich Pump & Plant Co., Ltd., The	Cover ii	Unifloc Reagents, Ltd.	i
Hackbridge & Hewitt Electric Co., Ltd.	xviii	Wallach Brothers, Ltd.	ii
Harris, Francis W., & Co., Ltd.	ii	Widnes Foundry & Engineering Co., Ltd.	xxi
Hill-Jones, Thomas, Ltd.	xvi	Yorkshire Tar Distillers, Ltd.	viii
Hull Development Committee, The	Front Cover		

Chemicals
INDUSTRIAL
AND FINE

HYDROGEN PEROXIDE
All grades and concentrations

PEROXYGEN COMPOUNDS • including
SODIUM PERCARBONATE • MAG-
NESIUM PEROXIDE • ZINC PEROXIDE •
UREA HYDROGEN PEROXIDE •
AMMONIUM, SODIUM AND POTASSIUM
PERSULPHATES • BENZOYL PEROXIDE

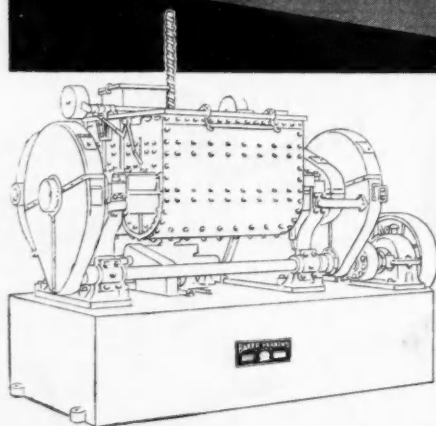
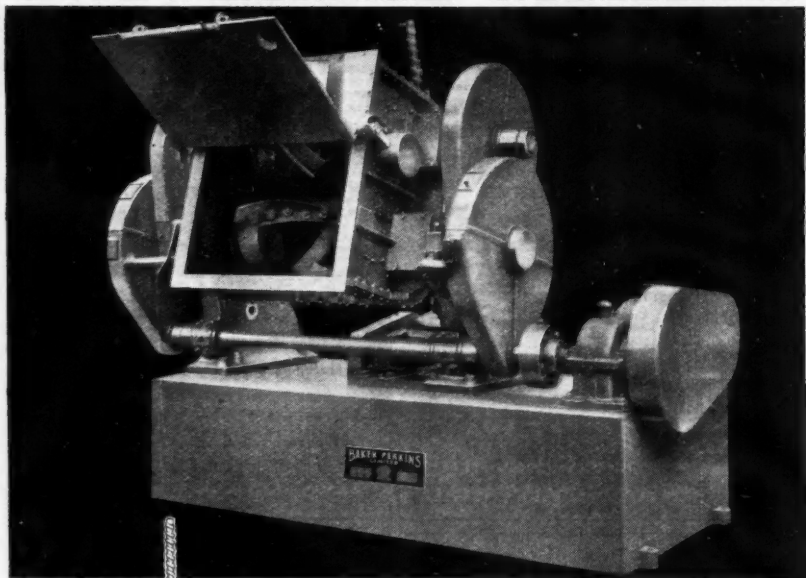
BARIUM COMPOUNDS
SODIUM SULPHIDES • SODIUM ACID
PHOSPHATES • SODIUM HYPO-
CHLORITE • METALLIC SOAPS
SULPHATED FATTY ALCOHOLS
SODIUM METASILICATE CLEANERS • ALKALINE

LAPORTE

LAPORTE CHEMICALS LTD., LUTON.

Telephone: Luton 4390 Telegrams: Laporte Luton.

UNIVERSAL MIXERS



The Universal principle is capable of very many adaptations. Here, for instance, is a special machine for mixing Dry Battery Paste. Trough interior and blades are coated with rubber and renewable blade-shoes of hard metal are fitted.

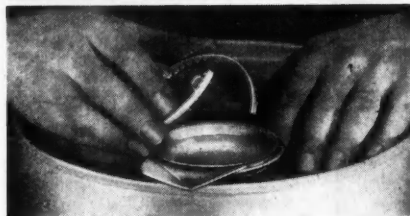
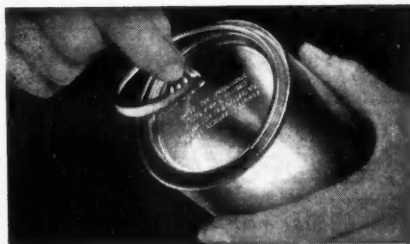
BAKER PERKINS

Engineers LTD

WESTWOOD WORKS - PETERBOROUGH



READS of Liverpool will again be exhibiting at the British Industries Fair to demonstrate their progress in the manufacture of tins, cans, drums, pilfer-proof closures and other metal productions.



The range of exhibits will include tins (both decorated and plain) of many shapes and sizes, cans, kegs and drums, utilising tin-plate, aluminium and its alloys, and other non-ferrous metals, together with Ringseal patent pilfer-proof lever-lid tins and Ringseal patent neck closures with integral spout for drums and cans.

Ringseals, once broken, cannot be replaced, giving the user an immediate indication that interference with the container or its contents has taken place.

Ringseal patent tins and closures will shortly be available in many of the world's major manufacturing countries.

READS OF LIVERPOOL

READS LIMITED Head Office: Orrell House, Orrell Lane, Liverpool 9. (Aintree 3600)
 London Office: 227 Grand Buildings, Trafalgar Square, W.C.2. (WHItchall 5781)
 Also at Glasgow, Belfast and Cork.

'NORGIL'

SCIENTIFIC GLASSWARE *for your particular problem.*

However exacting your requirements, whether precision volumetric, or ground apparatus, or simple products of maximum uniformity, you will find complete satisfaction in 'NORGIL' Laboratory Glassware.

Already preferred by many Laboratories, 'NORGIL' demonstrates our ability to be of service to you. We offer good delivery too.

Consult your Laboratory Furnisher today, and specify 'NORGIL' Apparatus *'for your particular problem.'*

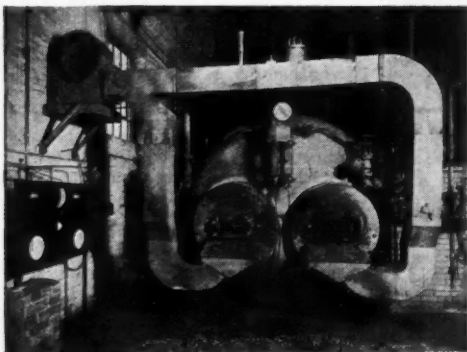
NORTHERN GLASS & INSTRUMENTS LTD.
HENDON DOCK. SUNDERLAND.

Telephone :
SUNDERLAND 247



Telegraphic Address :
NORGLASS, SUNDERLAND

OVER 40 YEARS EXPERIENCE



IN THE MANUFACTURE
OF
FORCED DRAUGHT
FURNACES FOR
CHEMICAL WORKS
STEAM BOILERS AND
STILLS

**Burning Fuels of any
type and size**

**THE CHEMICAL ENGINEERING AND WILTON'S PATENT
FURNACE COMPANY LIMITED. HORSHAM, SUSSEX.**

Northern Office and Fuel Engineer
T. G. Fegan, Cannonfield,
Hathersage, Nr. Sheffield.
'Phone: Hathersage 333

'Phone: Horsham 965
'Grams: Evaporator



FOR EVERY INDUSTRY

PHENOL . . . CRESYLIC ACIDS . . . PURE CRESOLS . . .

PHTHALIC ANHYDRIDE . . . BENZOATES . . .

SALICYLATES AND MANY OTHER

PHARMACEUTICALS . . . FLAVOURINGS . . .

PRESERVATIVES . . . GERMICIDES . . .

ANTISEPTICS . . . RUBBER CHEMICALS . . .

DYE-STUFF INTERMEDIATES.

Although the supply position on many Monsanto chemicals has greatly improved, some of the above products are unfortunately still restricted. In the meantime, however, we welcome your inquiries and will be glad to give you full information on present and future availability.

MONSANTO CHEMICALS LIMITED • LONDON SW1

THIS WAY TO THE UNKNOWN

WHEN Bernard Courtois discovered iodine in 1811 he opened a door to an immeasurable universe of knowledge and achievement.

Almost every year man finds a new use for iodine in the fields of medicine, agriculture and industry.

Iodine is one of the most potent and useful germicides we know. It is used in the prevention of goitre, the treatment of eye, respiratory and skin diseases. Recently it has been used successfully to stimulate lactation.

In agriculture iodine is vital to animal nutrition and reproduction.

In industry iodine is used in the manufacture of heat-sensitive and germicidal paints, dyes, insecticides, paper, textiles and



optical instruments, to name but a few.

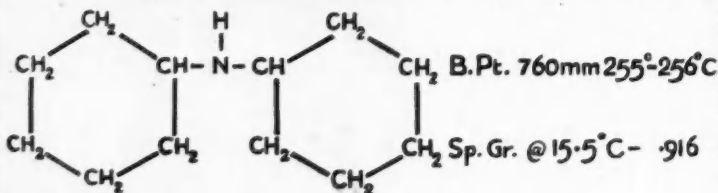
All that is known about iodine has been recorded and is kept up-to-date by the Iodine Educational Bureau. A fully qualified staff is maintained to assist with professional, research and development problems. The Iodine Educational Bureau makes no charge for its services. It is sponsored by the Chilean nitrate and iodine producers.



Iodine Educational Bureau

14 STONE HOUSE,
BISHOPS GATE, E.C.2

DICYCLOHEXYLAMINE



Dicyclohexylamine is a strong base, being stronger than Ammonia. It forms salts with all acids and forms soaps with fatty acids.

COMMERCIAL QUANTITIES AVAILABLE.

YORKSHIRE TAR DISTILLERS LTD

CLECKHEATON

TEL. CLECKHEATON

790 (5 LINES)



YORKSHIRE.


TELEGRAMS TO -

YOTAR CLECKHEATON

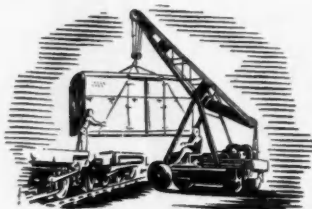
'PERSPEX'

- LININGS
- PHOTOGRAPHIC EQUIPMENT
- INSPECTION BENCH COVERS
- FOOD PROCESSING TANKS
- LIGHTING FITTINGS
- ACID PROOF
- INSTALLATIONS
- DUST COVERS
- MACHINE GUARDS

Contact I.C.I.



P. 312

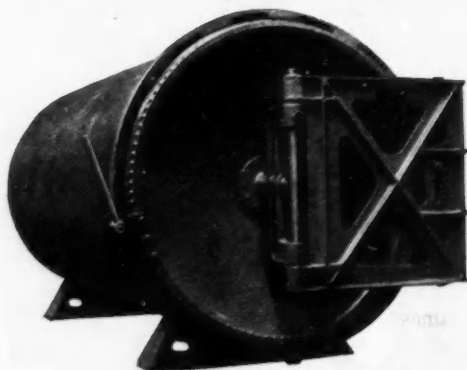


CONTINUITY OF TRANSPORT

REDUCE packing costs,
labour and materials, and obtain a speedy,
door-to-door service by using British Railways'
specialised road/rail container service.

CONTAINERS SPEED THE LOAD WITH
DOOR-TO-DOOR DELIVERY

BRITISH RAILWAYS



IMPREGNATING VESSEL FOR PRESSURE OR VACUUM
"F.Y.T." SELF-SEALING QUICK ACTING BOLTLESS DOOR

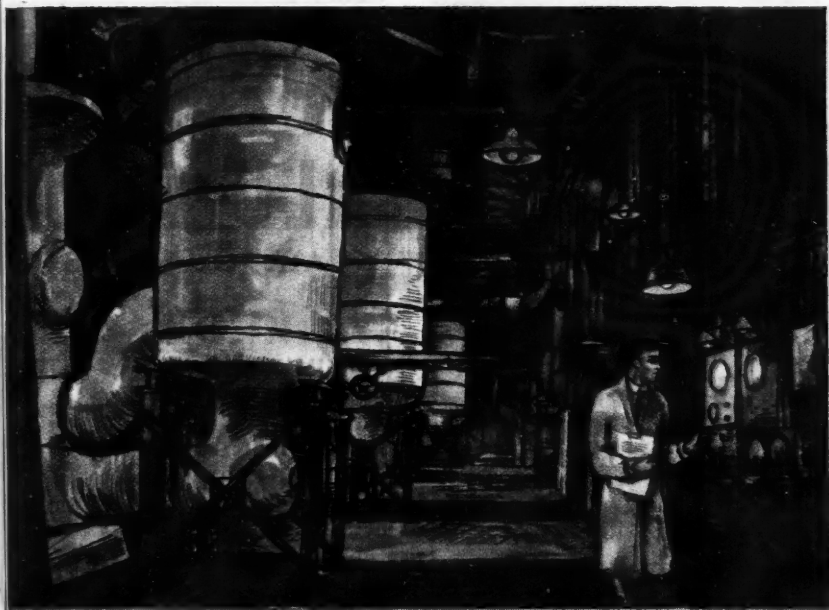
HYDRAULIC EQUIPMENT
HYDRAULIC & POWER PRESSES
CHEMICAL PLANT
RUBBER MACHINERY
WELDED FABRICATION WORK
CLASS "A" PRESSURE VESSELS
SHELL TYPE BOILERS
STEAM RAISING EQUIPMENT

FOSTER YATES & THOM LTD

Heavy Precision Engineers

BLACKBURN ENGLAND





Catalyst for Britain

ONE of the basic materials for industry produced by our Avonmouth works (a section of which you see here) is vanadium catalyst. Until 1939, we made only enough for our own vast output of sulphuric acid; now we make enough for sulphuric acid producers all over the country. And let's have no mock-modesty! We spent eleven years (1928-39) perfecting our vanadium catalyst; we know that nobody is producing a better catalyst for sulphuric acid; and we very much doubt if anybody will — for quite a time, anyhow!

It has the utmost practicable hardness and strength. It has an ignition temperature of 395° C. (which helps to ensure an economical and efficient rate of reaction). It is produced in two sizes: (1) length 8-10 mm., diameter 6 mm.; (2) diameter 4 mm. (when required). And our Technical Service will gladly advise you. Please write to our Catalyst Sales Manager for further information.

**IMPERIAL SMELTING
CORPORATION LIMITED**

37 Dover Street London W1

Manufacturers of Aniline Colours and Pigments

*Pattern Cards
on Request*

**ORGANIC
DYESTUFFS
LIMITED**
Pendleton Mills,
Croft-st., Pendleton

Tele: Pendleton 1081
"Grams: "Fascolour, Manchester"

SULPHATE of ALUMINA ALL QUALITIES

THE
ALUMINA COMPANY, LTD.
IRON BRIDGE
CHEMICAL WORKS,
WIDNES

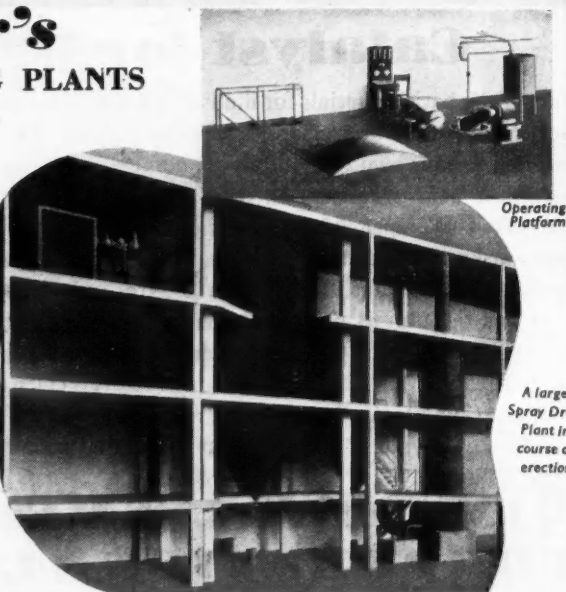
Telephone: Telegrams:
WIDNES 2275 (2 lines.) ALUMINA, WIDNES.

Kestner's SPRAY DRYING PLANTS

produce a uniform dry powder from solutions or solids in suspension in one operation. The drying is instantaneous and discharge of the finished product is continuous—thus enabling costly sensitive and organic materials like blood plasma or protein hydrolysates to be dried just as easily as metallic salts and industrial chemicals such as Magnesium Sulphate or Sulphonated alcohols.

There are many advantages to be obtained by using a spray drier in your process plant, but only a Kestner Spray Drier will ensure your getting the full benefit of the latest developments in spray drying technique.

Kestner's
CHEMICAL ENGINEERS



Operating
Platform

A large
Spray Drier
Plant in
course of
erection

5 GROSVENOR GARDENS, LONDON, S.W.1

Proved SUCCESSFUL RESISTANCE TO CORROSION

'Neutraline' Technique is constantly developing new materials for every requirement of modern Chemical Works :-

Acid-proof Bricks and Cements.

Acid-proof Flooring Materials.

Thermoplastic Tank Linings.

Fabricated equipment — Tanks, Ducts, Fans, Valves and Pumps in

NUTRADUR
and
NUTRABOND

one of our series of cements for brick lining of neutralising tanks, manholes and sewers used in the disposal or recovery of acid industrial wastes.

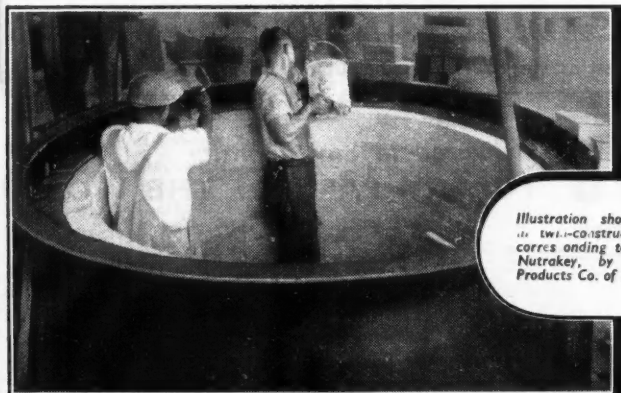


Illustration shows tank being lined in two construction with materials corresponding to our Nutrabond and Nutrakey, by the Atlas Mineral Products Co. of Pennsylvania.

We are specialists in EVERY problem involving acids and alkali-proof construction. Materials or complete job as required.

In your own interest, write us



TANKS AND LININGS LTD
DROITWICH

TOWN WHARF, DROITWICH
TELEPHONE DROITWICH 2249/0

GOLD
LINE

The NEW★ Volumetric Laboratory Glassware & Thermometers

GREEN
LINE

★ ACCURACY AND QUALITY

assured by Craftsmen using the most modern equipment and methods, plus thirty five years of specialisation.

★ READABILITY

Scientifically selected, colour filled graduations ensure greater accuracy of reading with less eye strain.

★ DURABILITY

Chemically resistant colours fused in the clearly etched graduations give life long service.

★ STOPPERS

Interchangeable and unbreakable.

★ PACKAGING

EACH piece of apparatus in its own protective carton. Economical standard case lots. NO CHARGE for cartons or cases.

★ DELIVERY

Many items "off the shelf." Distributed through recognised laboratory furnishers.

Write for fully descriptive Catalogue No. 3 and Price List.

H. J. ELLIOTT LTD.

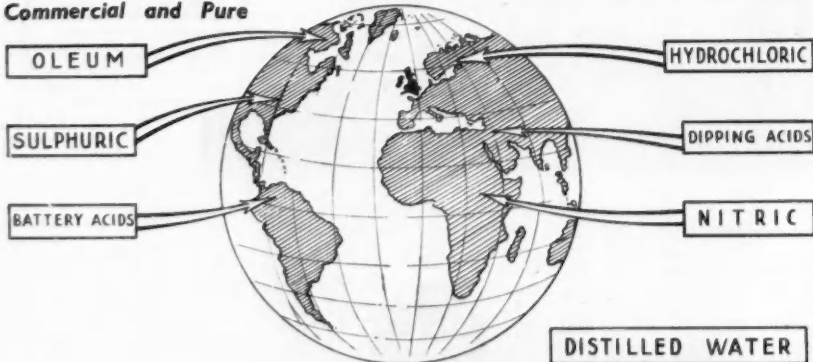
The largest manufacturers of laboratory glassware in the British Commonwealth

E-MIL WORKS, Treforest Estate, Nr. Pontypridd, Glam., Gt. Britain

Phone :
Taffs Wells 278 (3 lines)

ACIDS Delivered in any quantity TO ANY PART OF THE WORLD

Commercial and Pure



SPENCER CHAPMAN & MESSEL, LTD.

33, CHANCERY LANE, LONDON, W.C.2

Telephone : HOLBORN 0372 (3 lines) Telegrams : "Hydrochloric, Holb., London."

Works : SILVERTOWN, E.16

WHAT THE DUNLOP ANTI-CORROSION SERVICE CAN DO FOR INDUSTRY

We have long been studying the anti-corrosive properties of rubber. As a result of extensive research we can offer effective and economical solutions to many of the problems arising in the Chemical, Leather, Textile, Laundry and other industries where machinery and installations want protection from the corroding influences of Acids, Alkalis, Salts and Bleaches.

Dunlop products—pipe-line fittings, valves, stop-cocks, pumps and rollers in ebonite or rubber-bonded metal, are available to British Standard Specifications; Dunlop rubber linings can be fitted to give *longer life* to transport tanks, storage-plants, mixers and chutes; Dunlop co-operation is offered in the planning of special-purpose equipment and special research can be conducted to probe your particular problem of corrosion.



Subject to temperatures and concentrations specified by our Technical Department, Dunlop Anti-Corrosion Rubber provides satisfactory protection against these chemicals:

Acetic Acid
Carbonic Acid
Citric Acid
Formic Acid
Hydrochloric Acid
Hydrofluoric Acid
Hydrofluosilicic Acid
Hypochlorous Acid
Phosphoric Acid (up to 75%)
Sulphuric Acid
Sulphurous Acid
Tannic Acid
Tanning extracts
Vinegar

Ammonia
Ammonium Hydroxide
Ammonium Carbonate

Calcium Hydroxide
Caustic Potash
Caustic Soda
Milk of Lime
Potassium Carbonate
Sodium Bicarbonate
Sodium Carbonate
Bleach Liquor
Chlorine Gas (Dry)
Sodium Hypochlorite
Hydrogen Peroxide
Ammonium Sulphate
Copper Sulphate
Sea Water
Sodium Sulphate
Zinc Chloride (up to 50%)
Zinc Sulphate

Whatever the corrosive fluid used in your industry, consult Dunlop for the most effective anti-corrosive protection.

DUNLOP

Dunlop Rubber Co., Ltd. (G.R.G. Div.), Cambridge Street, Manchester, 1

FOUNDED 1830

Old-established yet up-to-date in every detail this organisation provides a specialised service for the chemical industry that ensures rapid delivery and low prices all the time

MANUFACTURERS AND PROPRIETORS OF
"INVICTA" DECOLOURISING
 CARBON

PLUMBAGO, CHARCOAL (Wood & Animal), **MANGANESE**

"INVICTA" BITUMINOUS MATERIALS
 FOR ROAD CONSTRUCTION

GRINDING With improved mills, of
 every description of
 chemical and other materials for the trade

THOMAS HILL-JONES, LTD.

MANUFACTURING CHEMISTS, INVICTA WORKS, BOW COMMON, LANE, LONDON, E.3.

and at MEESON'S WHARF, BOW BRIDGE, E.15 :: CONTRACTORS TO H.M. GOVERNMENT

Telephone : **EAST 3285** (3 lines).

Telegrams : **HillJones Bochurch, London**

"BIRABY" REGD.
STEEL DRUMS
 SINGLE TRIPPER & RETURNABLE TYPES



Our factory at Liverpool is designed and equipped for the production of high grade steel drums of many types, which can be supplied Painted, Galvanized, Tinned or Lacquer lined. Certain types can also be made from Stainless Steel.

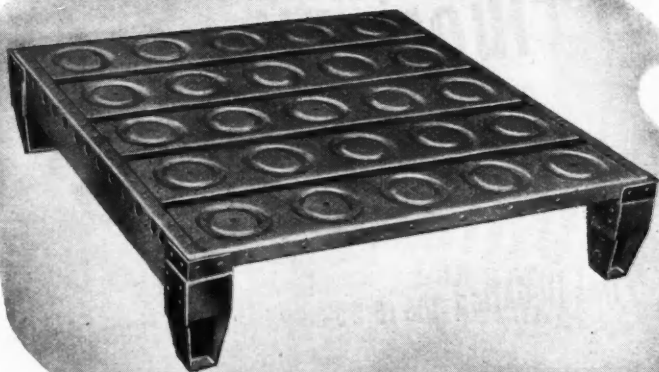


FRED^K BRABY & Co Ltd

LIVERPOOL
 LONDON
 EXPORT

HAVELOCK WORKS, AINTREE, LIVERPOOL, 10.
 FITZROY WORKS, 322-364, EUSTON ROAD, N.W.1.
 110, CANNON STREET, LONDON E.C.4
 ALSO AT GLASGOW, BRISTOL, BELFAST & PLYMOUTH

TEL: AINTREE 1721
 TEL: EUSTON 3456
 TEL: MANSION HOUSE 6034



This NEW development in Stillage PLATFORMS

**SAVES cost!
SAVES time!
SAVES labour!**

***Weights 28lb
Supports 30cwt***

has brought the science of "lightness plus strength" to Mechanical Handling. Light and ultra-light metal construction has reduced "dead weight" to such a degree that our platforms are only *half the weight* of a similar size in timber, yet able to support loads far in excess of normal requirements.

Our successful designs have been governed by—"Will they stand shock of impact?"—"Have they long life?"—"Are they impervious to rot?"—Yes! Yes! Yes!

Exhaustive tests in factories throughout the country have proved the durability of this latest advance in handling equipment.

Hygienic; non-splintering; unaffected by weather.

MADE IN ALL STANDARD SIZES

Please write for illustrated Brochure

Manufactured and distributed by **ESSEX AERO LTD GRAVESEND KENT**

For Fluorination CHLORINE TRIFLUORIDE



This liquefied gas is now available in limited quantities



For further information consult

IMPERIAL CHEMICAL INDUSTRIES LIMITED, LONDON, S.W.1

C.T.1



**HACKBRIDGE
TRANSFORMERS**

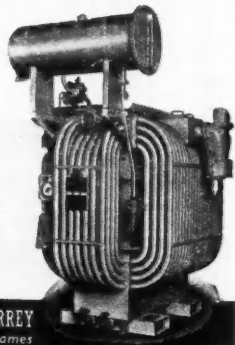
—for

INDUSTRIAL SUPPLY

HACKBRIDGE transformers are made in a very wide range of types, including many for special industrial applications such as the operation of electric furnaces and heat-treatment plant, A.C. arc welding, mining installations, low-voltage supply to portable tools, and high-voltage testing, while the installed capacity of normal Hackbridge distribution transformers, many supplying industrial loads, runs into MILLIONS of kVA.

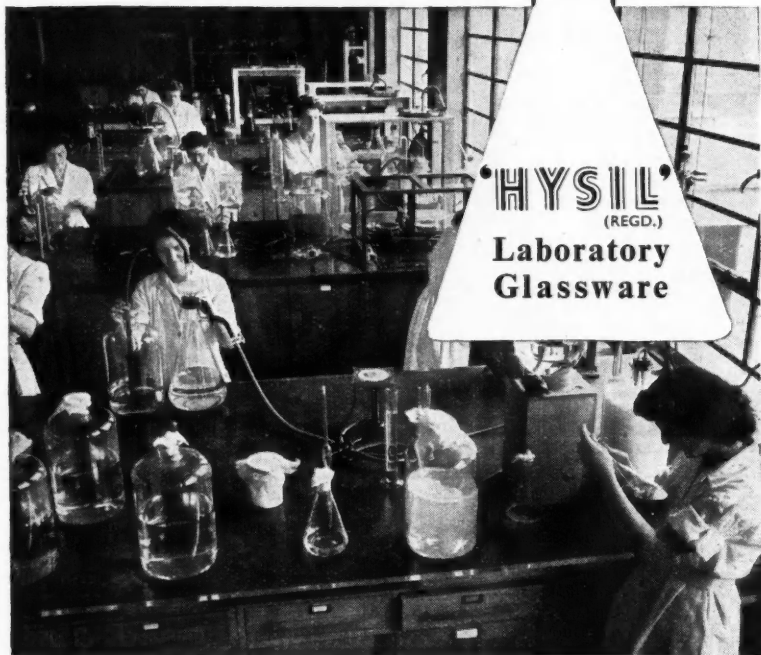
Here is a wealth of experience, acquired in a quarter century of transformer manufacture, underlining the choice of HACKBRIDGE transformers.

On right: A typical Hackbridge transformer—1,000 kVA., 3-phase, 11,000/460 volts—for industrial supply.



HACKBRIDGE AND HEWITTIC ELECTRIC CO. LTD., WALTON-ON-THAMES, SURREY
Telephone: Walton-on-Thames 760 (8 lines) Telegrams: "Electric," Walton-on-Thames

Glaxo Laboratories use . . .



This photograph of the Manufacturing Section of the Ampoule Department is reproduced by permission of Glaxo Laboratories Ltd. These famous laboratories are equipped in the most modern manner—and 'Hysil' glassware and 'Hysil' tubing are used extensively.

Chance
PRODUCT

By ordering the 'Popular' sizes of 'Hysil' you save both time and money, because—

They cost less
You get special discounts for Standard Case Lots
Your own ordering and stocking is simplified
Deliveries are quicker

The new 'Hysil' price list and full particulars of standard cases will be sent on request

CHANCE BROTHERS LIMITED. Glass Works, Smethwick 40, Near Birmingham.
Telephone: West Bromwich 1051. London Office: 28 St. James's Square, London, S.W.1.
Telephone: WHIttehall 1603. Branch Works at Glasgow, St. Helens and Malvern.

Pulsometer Pumps

ALL DUTIES

For

**Food and
Chemical
Industries
and
Processes**

LIST No. 3086

Pulsometer Engineering Co. Ltd.
The Churchfields, Reading

Rotary or Reciprocating

VACUUM PUMPS

for

Factory or Laboratory

Vacua obtainable:
Single Stage—up to 0.05
m.m.; Duplex—up to
0.0001 m.m. off perfect.

All Sizes & Types

for

High Vacuum
Displacement
Dessication
Distillation
Moist Air
Circuits



Illustrated is our
8/50" Single Stage
Rotary Vacuum Pump

PULSOMETER-DOULTON STONEWARE PUMP



**Acid - Proof
Non-Porous**
Will handle
most hot or
cold corrosive
liquids with-
out injury to the
pump. Free from
gland trouble.

CENTRIFUGAL PUMPS

made of

Stoneware and Special Metals

In all sizes for Food and Chemical
Industries and Processes.

Special Metal Pumps are made of special
corrosion resisting materials adapted to
the particular chemical required to be
pumped.

"NORDAC"

REGD.

**SOFT RUBBER LINING OF OLD
OR NEW TANKS AT OUR WORKS
OR ON SITE**

"VULCOFERRAN"

REGD.

**SPECIAL EBONITE LINING FOR
HIGH TEMPERATURE WORK**

**DESIGN AND CONSTRUCTION OF SPECIAL PURPOSE
PLANT A SPECIALITY**

NORDAC LIMITED

DUKES ROAD,

WESTERN AVENUE,

LONDON, W.3. Phone : ACORN 2289

The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

BOUVERIE HOUSE, 154 FLEET STREET, LONDON, E.C.4

Telegrams: ALLANGAS FLEET LONDON

Telephone: CENTRAL 3212 (20 lines)

SCOTTISH OFFICE:

16 Hope Street, Glasgow (Central 3970)

MIDLANDS OFFICE

Daimler House, Paradise Street, Birmingham (Midland 0784-5)

THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited

VOL. LX
No 1549

19 March 1949

Annual Subscription 30s.
8d. per copy, post paid, 10d.

The Patents and Designs Bill

THE new Patents and Designs Bill published last week proposes to carry into effect most of the reforms suggested by the Swan Committee. This committee published an interim report, which formed the basis of the Amending Act of 1946. The present measure derives from the second and final reports. It is to be followed by a Consolidating Act next year and a White Paper has been published at the same time as the Bill giving the text of the Consolidating Act. These two stages are necessary because the present Bill is certain to be opposed; but a consolidating measure, which is described as such only on the certificate of the parliamentary draughtsman, is by tradition never opposed.

The high cost of litigation was one of the most serious complaints which the Swan committee had to consider. This cost was capable of operating most unfairly, as the small man, right or wrong, might be unable to afford to litigate to protect his discovery, as powerful industrial groups would do. The City Editor of *The Times* has referred to "the traditional feeling that the grant of a patent is merely a licence for High Court litigation."

The Bill contemplates that the jurisdiction of the Comptroller of Patents should be extended so that he may, with the consent of the parties, try any dispute concerning the infringement of a patent or

the patent's validity. His power to award damages (unless otherwise agreed by the parties) would be limited to £1000. If the dispute involves questions which would more properly be determined by the Court, the Comptroller would be entitled to refuse to deal with it. Appeals from the decisions of the Comptroller would go to the Patents Appeal Tribunal. At present, appeals in cases relating to patents already granted go to the High Court. This is expected substantially to reduce the amount of work in the High Court. The Bill accordingly proposes the addition of only one puisne Judge who would deal primarily with patent cases. The Swan Committee had considered two such judges to be necessary.

The Swan Committee recommend by a large majority that the Comptroller should have the power to reject an application on his own initiative on the ground that the invention lacked genuine inventive merit (or "subject-matter") and that lack of inventive merit should be an additional ground on which opposition to the grant of a patent could be based. A minority of two opposed these proposals and they had been the source of considerable controversy. The Bill adopts a compromise. The Comptroller would not have power to reject an application for these reasons on his own initiative; but they might be a ground for opposition proceedings. These might also be based on the ground that

On Other Pages

<i>Leader :</i>		<i>Food Science Study ...</i>	417
<i>The Patents and Designs Bill ...</i>	409	<i>New Helium Liquefier ...</i>	418
<i>Notes and Comments :</i>		<i>Manufacture of Plastic Lignin ...</i>	420
<i>World Conference ...</i>	411	<i>French Oil Amalgamations ...</i>	422
<i>German Price-Cutting ...</i>	411	<i>Cheaper Synthetic Cresol ...</i>	422
<i>Prospects for Antricide ...</i>	412	<i>High Vacuum Distillation ...</i>	423
<i>Conserving World Resources ...</i>	413	<i>India's Fertilisers ...</i>	424
<i>No Oil Shortage : Revised Estimates in the U.S.A. ...</i>	413	<i>The Nitric Acid Route ...</i>	424
<i>U.S. Gift to OCCA ...</i>	414	<i>Italy's Sulphur Problem ...</i>	425
<i>Regulating International Traffic in Containers ...</i>	414	<i>Expansion of French African Chemical Industries ...</i>	425
<i>Export Licensing ...</i>	415	<i>Letter to the Editor :</i>	
<i>Solvent Extraction Plants ...</i>	415	<i>German Scientific Instrument Prices ...</i>	426
<i>10 Million Tyres Exported ...</i>	415	<i>More Raw Materials for German Industries ...</i>	426
<i>Production Outpaced Demand in December ...</i>	416	<i>A Chemist's Bookshelf ...</i>	428
<i>January's Output ...</i>	416	<i>Scottish Fluorine Allegations ...</i>	431
<i>Rising Employment ...</i>	416	<i>Vitamins and Hormones : New Scottish Project ...</i>	431
<i>U.S. Organic Chemicals ...</i>	417	<i>Parliamentary Topics ...</i>	433
<i>Canadian Glycol Expansion ...</i>	417	<i>New Chemicals at the BIF ...</i>	433
<i>International Technology ...</i>	417		

the invention had previously been used in the United Kingdom.

Dr. James G. Fife, in an authoritative survey of existing Patent Law (*THE CHEMICAL AGE*, 60; 80, 125) dealt with the difficulties which arise in drafting the specification of applications for chemical patents. The Bill takes cognisance of this by providing that, "where a complete specification includes a claim for a substance the claim shall not be invalidated by reason only that it is not limited to the substance when produced by specified methods or processes of manufacture, notwithstanding that the substance is a substance prepared or produced by chemical process or intended for food or medicine; but the Comptroller may refuse an application for a patent if it appears to him that it claims as an invention a substance capable of being used as food or medicine which is a mixture of known ingredients possessing only the aggregate of the known properties of the ingredients or that it claims as an invention a process producing such a substance by mere admixture."

A further provision relating to food or medicine requires the Comptroller, on application by any person interested, to order the grant of a licence on such terms as he shall think fit. In settling the terms the Comptroller is to endeavour to secure that food, medicines and surgical and

curative devices shall be available to the public at the lowest prices consistent with the patentees deriving a reasonable advantage from their patent rights.

The remedy which the Bill proposes against abuse, or insufficient use, of patent rights is the grant of a compulsory licence to work the invention, or the endorsement of the patent "licences of right" so that anyone can obtain a licence as of right, or in special circumstances, the revocation of the patent.

The grounds upon which patents may be so endorsed are extended to cover cases where the invention is not being worked to the fullest possible extent, where an export market is not being supplied, or the working of another patent is being hindered by the refusal of the patentee to grant a licence upon reasonable terms. Proceedings for such an endorsement may be taken by a government department. The last will no doubt depend upon reports of the Monopolies and Restrictive Practices Commission set up under the Monopolies Act of 1948.

Any statement by the Commission with respect to the making, using, exercising or vending of the patented invention, or with respect to the grant or refusal of licences under the patent shall be conclusive evidence of the matters stated. This promises to confer on the Commission a

(Continued on page 412)

NOTES AND COMMENTS

World Conference

IN about 1796, while preparing his schemes for the foundation of an institution to be devoted to the application of science and invention to the improvement of the lot of the poor (which later became the Royal Institution), that remarkable product of England and America, Sir Benjamin Thompson, Count Rumford, was acutely aware of the necessity of utilising the world's resources to their best advantage. He declared that with the waste smoke from London he would undertake "to warm every house and to cook all the food used by its population." Now, over 150 years later, recognition has been revived of the importance of conserving the world's dwindling supplies of raw materials, which, even if not as meagre as some alarmists would have us believe, are being taxed as never before and are certainly not renewable. In August next a special gathering of experts—the United Nations Scientific Conference on the Conservation of and Utilisation of Resources—will be held at Lake Success. This was described in a Press conference last week (page 413) by the head of the overseas liaison division of the Department of Scientific and Industrial Research as the spearhead of an attack to implement the much publicised "fourth point" of President Truman's inaugural address. This, representing a long cherished ambition of the President's—and of most other reflective minds—was first contemplated in September, 1946, when he suggested that such a scientific conference should be held "to bring together all the new techniques of resource, conservation and utilisation, particularly for the benefit of underdeveloped areas." The conference will be seen as another tangible evidence that the American President's conception of liberal scientific exchanges between nations was not mere wishful thinking; even Russia, it is said, is to contribute papers and is expected to send delegates. Most promising portent for the outcome of this conference is the fact that the contributors will be serving purely as individuals, free to speak their minds, not as mouth-pieces for national or sectional interests.

German Price-Cutting

THE evident resentment of some sections of scientific instrument manufacturing industry, evoked by the recent evidence of the German industry's successful bids to recover world markets, without much regard to price, has not been appeased by the recent German "explanation," nor has it expired in diminishing rumbles. The Scientific Instrument Manufacturers' Association is seeking to interest H.M. Government in the abnormal situation which not long ago enabled the West German manufacturers of microscopes, Ernst Leitz, G.m.b.H., to undercut the lowest British tender to India for 400 instruments by the equivalent of £10,000. That was some 33 per cent lower than the British price, a reduction on a scale which no ordinary economy in production could account for. Mr. J. E. C. Bailey, the SIMA president, who first called attention to this aspect of German price reductions, was finding more alarming evidence of the same kind in South Africa last week. In Salisbury, for example, there is at least one new Leitz research microscope which cost just about £100 less than the best price an English or American maker could now quote. Nothing is said about quality of the German instrument, but it may be assumed that it was fit for the exacting requirements of modern research equipment. That, of course, is not the whole story of the somewhat sensational reduction in values which, it is contended, British and American subsidies and low wages have made possible for Germany, and it can scarcely be coincidence that the other outstanding price competitor in world markets is also an ex-enemy country now under Allied tutelage—Japan. There, notwithstanding reports of continued chemical shortage, their textile manufacturers are understood recently to have secured a South African order worth £3½ million sterling. They undercut the U.S.A. by 50 per cent. (Letter to the Editor: page 426.)

The Unmissed Vitamin

MANY widely accepted theories about human powers of resistance were unceremoniously made to appear foolish

between 1939 and 1945—and not all of them had to do with the totalitarian aggressors of human wellbeing. One such example of the discrediting of a doctrine has now been revealed by the Medical Research Council in report ("Vitamin A Requirements of Human Adults") which will delight those sceptics who regard current interest in the provision of artificial supplies of the commoner vitamins as the mark of the eccentric. The outbreak of war and its revelation that scabies was disconcertingly prevalent in the larger cities gave rise to anxious speculations at the Health and Food Ministries, and finally, at the end of 1940, to "an experimental study of the natural history and mode of transmission of scabies" started under the direction of Dr. Kenneth Mellanby. The results, now presented with a wealth of medical data, were highly unexpected. They showed that 16 human "guinea pigs" on a diet devoid of common sources of vitamin A and carotene persistently failed to exhibit the signs of deficiency disease which were expected to be manifest in a few months. The medical observers found only a gradual reduction of the vitamin A content of the blood plasma and a deterioration in ocular adaptation to darkness. Although some continued the diet for 18 months (instead of six or eight) and one for two years, only three of the 16 showed even these moderate symptoms of deficiency. This very limited study of the rôle of one vitamin has, of course, no bearing on the probable utility of the current studies of specialist uses in pathology of other vitamins. It does, however, convey a salutary reminder of the human body's wayward habit of upsetting even the best of theories—regardless of laboratory results.

THE PATENTS & DESIGNS BILL

(continued from page 410)

much more decisive authority than was contemplated when the purposes of the Commission was debated last year.

The Bill is quite a long measure, containing 51 sections and three schedules. A great many changes of detail are made. One of the more important of these is a new provision enabling an inventor to assign his patent rights even before the application is made and to give his assignee the right to carry on with the application. This should be of some assistance to

Prospects for Antrycide

THE known facts about Antrycide, the "M7555" product of the I.C.I. laboratories at Blackley, Manchester, which may change agricultural economy throughout wide tropical areas, seem meagre by contrast with the great field of conjecture about its potentialities and limitations. So far, it is encouraging to note, most of the hopeful questions have received affirmative answers and there has been no evidence of any serious impediment to its wide use to immunise cattle against trypanosomiasis. The possibility that, like streptomycin, it might give rise to a race of resistant parasites has been raised in the House of Commons, but there is as yet nothing to show that the parallel is an accurate one. The final answer to many of these questions will not be quickly arrived at. That is made clear in a very interesting summary of the genesis of Antrycide and some of its possibilities which Mr. S. Ellingworth, of the Blackley laboratories, contributes in the current issue of the *I.C.I. Magazine*. This makes it clear, however, that notwithstanding possible snags and limitations, the field of operation for Antrycide is likely in the end to be infinitely wider than the East African areas in which the first field trials were carried out by Dr. D. G. Davey. The writer mentions, for example, that the drug has cured cattle infected with three species of trypanosome (*congolense*, *vivax* and *brucei*), has been effective against *brucei* in donkeys, horses and dogs, against *evansi* in camels in the Sudan and *simiae* in pigs. That is recognised as constituting a brilliant start in a quest which must now lead to new conquests.

inventors, who are anxious to dispose of the fruits of their work for cash.

The members of the Swan Committee may be gratified to see so much of the fruit of their work so quickly translated into legal form. It was once a common practice to leave such reports to moulder in Whitehall pigeon holes for many years, before they saw light in Parliament. It must be apparent, however, so highly controversial are some of the provisions now being recommended, that the passage of this Government measure will not be achieved without some violent opposition.

CONSERVING WORLD RESOURCES

Scientists to Confer at Lake Success

THE first world conference of scientists organised by the United Nations is to be held at Lake Success from August 17 to September 6 and all the portents are that its objectives and the nature of the support promised may render it historically important. This is the United Nations' Scientific Conference on the Conservation and Utilisation of Resources which was authorised by the Economic and Social Council and will be devoted to an exchange of ideas and experience on the preservation and best methods of utilising the raw materials of the world. New means of drawing riches from the earth—from creating fresh plant and animal hybrids to improving methods of mineral discovery—will be discussed by experts and technicians from all parts of the globe.

As Individuals

Two aspects of this conference deserve particular attention. The first is that the participating scientists—some 750 are expected to attend—will be there on the merits of their information and achievements and not as representatives of governments; the second is that the unfettered scientific opinion of these experts will be made available to all and the conference itself will have no policy-making responsibilities. It will neither bind governments nor make recommendations to them.

The first half of the conference, the plenary meetings, will be devoted to the examination of the world's potential resources, the rate of their depletion and consideration of past waste and misuse. Under the heading "Using and Conserving Resources" questions will be dealt with on

soil and forest conservation, estimates of undiscovered oil and gas reserves and, among resources which can be created or recovered, fodder yeast and algae for food, and for industrial raw materials, plastics and elastomers, the contribution of chemistry and wood cellulose. The plenary meetings will conclude with a review of experience in projects based on the co-ordinated application of resource technique. The second half or section meetings will be devoted to mineral sources; fuels and energy; water supplies; forests; land resources; and wild life, fish and marine resources.

Mr. H. L. Verry, head of the Overseas Liaison Division of the Department of Scientific and Industrial Research told a Press conference last week that some 60 papers would be contributed by the United Kingdom. All the authors had been invited to attend, but it was not practicable in all cases. It was, however, hoped that a team of about 24 U.K. representatives would be there. It was not possible to defray their expenses, but every assistance would be given to experts.

Answering questions, Mr. Verry said the full agenda and names of British representatives would be announced shortly. Dealing with the method of publication of papers, he said that the importance of this was fully appreciated and he realised that the British Press did not want to receive information only after the full reports had appeared in America.

It was also announced that various films would be made on several matters being covered by the conference, to form an international library.

"No Oil Shortage": Revised Estimates in the U.S.A.

A FORECAST of new shale oil production from the Rifle area, Colorado, on a scale which would offset America's continually increasing consumption, was an arresting contribution at last week's meetings in Los Angeles of the American Institute of Chemical Engineers.

It was given by Mr. Boyd Morris, of the U.S. Bureau of Mines, who considered it likely that oil yield from this deposit might ultimately expand American output tenfold. It was capable, he said, of producing in all some 350,000 million barrels.

Despite continually increasing demands, world oil production is now esti-

mated to be more than sufficient to meet current requirements. The U.S.A. in particular, has ample reserves of both crude oil and natural gas—according to Major-Gen. Ernest O. Thompson, Texas Railroad Commissioner.

Since V-J day, he said, in an address to the Associated General Contractors of America in New York, U.S. production has increased by one million barrels a day, while the industry is completing a construction programme of two and one-half billion dollars, and the gas industry plans to spend three billion dollars in the next four years.

U.S. Gift to OCCA

Common Interests for Science, Art and Industry

THE esteem in which the Oil and Colour Chemists' Association is held, here and in the U.S.A., was manifest at the association's annual dinner in London last week in the gathering of distinguished guests, representing art, science and industry, and in a presentation to the president, Dr. L. A. Jordan. This was an extremely handsome gold and enamel presidential insignia, the gift of the American Reichhold-Beck Koller group, which Mr. W. H. Breuer, vice-president of Reichhold Chemicals, Inc., presented and with which Sir Edward Appleton formally invested the president.

Academician's Testimony

The painter's debt to the colour chemists was cordially acknowledged by Sir Gerald Kelly, R.A., proposing the principal toast. He recalled that the Royal Academy, which had represented the fine arts since the 18th century, had always retained a professor of chemistry, formerly the late Sir Arthur Church, that most distinguished man who had blazed the trail for the scientific investigation of painters' materials. The speaker deplored the fact that none of the art schools being founded all over England had any chemical or scientific advice at all. He hoped to see a greater degree of mutual help between painters and makers of paint.

Mr. W. H. Breuer, presenting the insignia, spoke with satisfaction of the closer alliance which had been established between paint makers and their organisations here and in the U.S.A. and acknow-

ledged the great contribution made by Dr. W. H. Keenan in bringing that about.

Sir Edward Appleton, performing the investiture, recalled that Dr. Jordan and he had been close colleagues during his official life, now closing, in the Department of Scientific and Industrial Research, and he had watched with genuine admiration Dr. Jordan's great work, not only as an individual scientist, but as a leader of scientists, in one of our great traditional industries, the paint industry. As a scientific colleague and an old friend, it was a real pleasure to him to invest Dr. Jordan with the presidential symbol, an expression of their friendship for him and all the members of the association from colleagues in America.

Manufacturers to Collaborate

Acknowledging his and the association's gratitude for the gift, the president spoke of the conviction in this country of America's good intention and sincerity, which was especially valuable at a time when the world appeared to be divided into factions. He went on to speak of the continuing essential close collaboration between artists, scientists and paint makers and said that the association was looking into means of making it easier for manufacturers to become more closely associated with its scientific work through some form of subscription. That would bring them the satisfaction of knowing that they were linked with a worthy purpose.

Regulating International Traffic in Containers

THE International Container Bureau, associated with the International Chamber of Commerce, is studying the provisions that should be made for (empty) container traffic when the forthcoming revision of the Berne Conventions, which were drawn up in 1923, is undertaken. The bureau considers that the revised convention should have a separate annex dealing with container traffic and is trying to secure a generally acceptable definition of the term "container." The International Container Bureau urges that:—

1. As a general rule containers should have treatment no less favourable than other kinds of traffic and that where restrictions are placed upon their use, these restrictions should be temporary.

2. Dispatches by containers should have

the same rights and privileges as those by ordinary traffic.

3. The time limit laid down for the delivery of empty privately-owned containers should be the same or for ordinary traffic.

4. The railways should be responsible for the loss or damage to movable accessories entered on the waybill.

On the other hand, the ICB recognises that the obligation of railways to place containers at the disposal of the public must always be limited by the practical possibilities, and railways should be able to demand payment for supplying containers. Also, containers belonging to railways should not be used again by consignees without authorisation. They should be returned empty to the railway concerned within a given time limit.

Export Licensing

Changes Affecting Chemicals

CHANGES in export licensing control made by a Board of Trade order (S.I. 1949, No. 384) which came into operation on March 16, permit the shipment without export licences on and from that date of some essential oils, soap substitutes, ethyl acetate, and specified paints. Export licences will be required in future, however, for cobalt in certain forms.

In Group 3, items deleted include preparations, products and substances (whether or not exported as substitutes for soap) in respect of which there are in force licences granted by or on behalf of the Minister of Food under the Soap Substitutes (Labelling and Prices) Order, 1943(e). Products of the sulphation (sulphonation) of aliphatic alcohols and aliphatic hydrocarbons, salts of such products, and mixtures (other than medicinal preparations, insecticides, fungicides, weed killers, animal dips and disinfectants) containing any of the foregoing. Soapless shampoos.

Under the heading of essential oils, items no longer requiring an export licence include:—Bergamot, birch tar, cedarwood, cloves, grape fruit, lemon, mandarin (tangerine), orange, pimento leaf, sandalwood, shiu (ho).

To the list of exceptions, under the heading relating to oils, the following have been added:—Paints, paste paints (including metallic pastes), painters' enamels, pigments in medium, lacquers and varnishes other than those specified in Group 13(1) of this schedule.

In Group 13(1), ethyl acetate has been deleted, and the items relating to carbon blacks and chromium compounds have been deleted and the following substituted: Carbon blacks and mixtures containing carbon black, but not including lacquers, paints, paste paints and painters' enamels unless specified elsewhere in this group. Chromium compounds and preparations thereof, but not including lacquers, paints, paste paints and painters' enamels unless specified elsewhere in this group.

The item relating to pigments has been deleted and the following inserted: Paints, paste paints (including metallic pastes), painters' enamels, pigments in medium, lacquers and varnishes, containing more than 50 per cent by weight of one of the following: Lead compounds, linseed oil, lithopone (including cadmium lithopone), titanium oxides

Ten Million Tyres Exported

Britain made well over 10 million tyres for export last year, 3 million more than the record of 1947. "We equipped more than £125 million worth of motor vehicles, aeroplanes, motor cycles and bicycles sent overseas in 1948," says Mr. G. E. Beharrell, president of the Tyre Manufacturers' Conference; "and we shipped just on £12.5 million worth of tyres and tubes direct. The industry has good reason to be proud of its share in the export drive." The total was made up as follows: Aircraft, 16,448; motor vehicles, 1,473,378; motor cycles, 130,113; bicycles, 3,595,729.

Solvent Extraction Plants

Use in Refining Mineral Oils

SOME of the fundamental principles governing the operation of solvent extraction plants which refine mineral oils in the kerosine, gas oil and lubricating ranges were outlined in a paper on "Solvent Extraction as a Unit Process," presented by Mr. J. C. Wood Mallock at a meeting of the North-Western branch of the Institution of Chemical Engineers, in Manchester last week.

Solvent refining was developed in the petroleum industry following the introduction of liquid sulphur dioxide as a solvent for the extraction of aromatic hydrocarbons from illuminating oils. Later, lubricating oils were refined by this and other solvents, and the operation was extended to petroleum, diesel and other oils.

Solvent Requirements

Maximum yields of refined oils of a given quality are obtained when either a temperature or a composition gradient is used. The extraction aims at the production of a given solvent-rich fraction as extract from a raw material and a solvent-lean raffinate, two phases being present. The primary requirements of the solvents were given, two principal ones being solvent power and selectivity.

For the investigation of these requirements, a standard distillate is extracted isothermally with repeated batches of selected solvents. The contents of the extracts cannot be evaluated analytically and therefore an additive physical property, such as the viscosity-gravity gradient, is used according to the Torres method.

The desired degree of extraction of an oil is known and the characteristics of the ultimate extract are computed from data obtained by plotting extract-solvent-raftinate relationships on triangular co-ordinate graphs. When extracting such mixed hydrocarbons as lubricating oils, key components are defined and they have suitable viscosity-gravity characteristics to represent raffinate and extract phases.

The solvents used in the petroleum industry show preferential solubility for compounds of low molecular weights in a series. Batch and continuous extractions are employed. Counter flow and parallel flow multiple contact systems employ either batch settling or mechanical separators. The packed column may be employed as a contact unit with a specified number of transfer units or plates of a certain stage efficiency.

Mr. Wood Mallock concluded his paper by discussing the extraction of a medium lubricating oil with sulphur dioxide.

Production Outpaced Demand in December

Smaller Consumption of Metals Recorded

PRODUCTION figures and stocks of a large range of basic chemicals and metals were generally higher in December last year than in the same month of 1947. There was, however, a small but unmistakable reduction in the rate of consumption of several materials, and especially of metals. Detailed figures set out below (the *Monthly Digest of Statistics*, No. 38, February, 1949) also show that the estimated number of persons engaged in chemicals, coke-ovens and by-product works

in December, 1948, was 244,800 (169,100 men and 75,700 women.) This was slightly less than the previous month, changes involving a slight increase in the number of men and a slight decrease in the number of women employed. The figure still was 1800 higher than the total for December, 1947. In the oils, greases, paints, varnish, etc., industries employment in December, 1948, was given as 119,300 (83,200 men and 36,700 women).

	December, 1948			Stocks	December, 1947		
	Production	Thousand Tons	Consumption		Production	Thousand Tons	Consumption
Sulphuric acid	139.0*	—	—	—	130.6*	134.0*	—
Sulphur	—	24.6*	71.4*	—	—	21.9*	83.9*
Pyrites	—	19.5*	57.0*	—	—	20.8*	68.0*
Spent oxide	—	17.1*	169.3*	—	—	15.8*	165.4*
Molasses (cane and beet)	59.7	25.5†	278.0	56.6	27.6†	239.9	—
Industrial alcohol (mil. bulk gal.)	1.83	2.39	7.89	1.99	2.34	7.63	—
Superphosphate	18.2	16.3	—	17.2	17.7	—	—
Compound fertilisers	141.3	111.9	—	137.8	107.1	—	—
Liming materials	—	453.1	—	—	445.5	—	—
Ammonia	—	6.65*	6.29	—	6.29*	4.28	—
Phosphate rock	—	94.3	161.2	—	78.4	171.9	—
Virgin aluminium	2.68	16.3	—	2.59	12.7	—	—
Virgin copper	—	29.5	120.7	—	27.5	110.2	—
Virgin zinc	—	18.0	46.7	—	20.3	32.1	—
Refined lead	—	17.2	20.0	—	18.2	40.0	—
Tin	—	2.11	19.2	—	2.47	15.6	—
Zinc concentrates	—	12.7	30.0	—	13.6	52.0	—
Pig iron	178.0*	—	278.0*	168.0	—	219.0	—
Steel ingots and castings (including alloys)	289.0*	—	1029.0	281.0*	—	797.0	—
Rubber: Waste collected	—	—	—	—	—	—	—
Reclaimed	0.47	0.44	4.25	0.46	0.52	4.33	—
Natural (including latex)	—	7.06	50.5	—	3.82	127.2	—
Synthetic	—	0.05	2.06	—	0.05	2.13	—

* January, 1949, and January, 1948.

† Distilling only.

JANUARY'S OUTPUT

ALTHOUGH figures for industrial production in Great Britain during January were generally lower than those for December, 1948, this was not reflected in the estimated output of the chemical industry, which showed an improvement by comparison with December and with January, 1948.

This is recorded in an index compiled by the London and Cambridge Economic Service. Figures based on an average weekly rate of production (1946 = 100) are as follows:—

Group	1948				1949	
	Jan.	Sept.	Oct.	Nov.	Dec.	Jan.
Chemical and allied trades	113	120	124	126	117	125

RISING EMPLOYMENT

EMPLOYMENT in the chemical and allied industries in Great Britain in December, 1948, according to the current *Ministry of Labour Gazette*, again showed a substantial increase in the aggregate compared with the figures in mid-1947 and mid-1939. Explosives was the only individual section which showed a decrease compared with mid-1939. The sectional distribution of labour was as follows:—

Industry	(Thousands)		
	Dec. 1948	Mid-1939	Mid-1947
Coke ovens and by-product works	14.5	12.4	13.7
Chemicals	195.2	124.8	187.9
Explosives	35.1	37.1	34.6
Paint, varnish, etc.	31.9	26.9	30.0
Oil, glue, soap, ink, etc.	87.4	93.2	81.6
Total, chemicals, etc.	364.1	294.4	347.8

U.S. Inorganic Chemicals

Increasing Production Levels

U.S. production levels of industrially important inorganic chemicals for December, 1948, were generally higher than those reported for November, or December, 1947, according to official Government statistics. Increases above November, 1948, were reported for 24 of the 35 chemicals surveyed, while decreases were reported for nine.

Record high production levels were reported in December for four chemicals, synthetic ammonium sulphate exceeded the previous highest record of 46,147 short tons attained in the preceding month by about 13 per cent; chlorine exceeded by about 4 per cent the quantity for October, 1948, when 147,593 short tons were produced; about 4 per cent more sodium hydroxide (caustic soda) was produced than the record of 212,494 short tons for November, 1948; and sulphuric acid surpassed the record of 964,142 short tons set in December, 1947, by 25,745 short tons, or about 3 per cent.

Two Decreases

Production gains of 5 per cent or more over the preceding month were also reported for synthetic ammonia, ammonium nitrate, calcium carbide, and phosphoric acid. Sodium silicate and carbon dioxide are the only "heavy volume" chemicals for which a production decrease from the November, 1948, quantity was reported.

A total of 20 million lb. of primary magnesium ingot was produced in the United States in 1948, according to a report just released by the Magnesium Association, which also shows that the 1948 production showed an increase, 12 per cent net over the 1947 output. The total amount of magnesium metal used during the year, including secondary magnesium, was about 30 million lb., employed over an increasing field of industry.

Canadian Glycol Expansion

The Dow Chemical of Canada, Ltd., will begin a \$5 million plant expansion programme in Sarnia during 1949, it was announced here by N. R. Drawford, Toronto, president of the company. The programme will involve the building of four new plant units, a central research laboratory and extension additions to another plant unit. The project will raise to more than \$17 million the value of Dow Chemical units in the Sarnia area. It forms part of a long range development programme aimed at an eventual plant investment of \$40 million.

International Technology

Publisher Urges Freer Exchange

INTERNATIONAL exchange of technical knowledge, advocated by President Truman in his inaugural address, will receive strong support from an American, Mr. James S. Thompson, vice chairman of the board of the McGraw-Hill Book Co., Inc., at the Second International Technical Conference, to be held in Cairo, Egypt, from March 20-26. Mr. Thompson is the author of a paper, "Technical Literature, Its Responsibility as an International Influence," to be delivered before the World Engineering Conference which is holding the congress at Cairo.

Added Responsibilities

This has brought into prominence all those responsible for the dissemination of technical literature and presented practical problems to publishers who wish to co-operate fully with plans now under discussion by the United Nations Educational, Scientific and Cultural Organisation and other international bodies, Mr. Thompson declares.

A post-war era of constantly changing techniques, new developments in science and engineering, freshly defined requirements in training personnel for increased productivity, and rapidly spreading demands for circulation of the new techniques in engineering, Mr. Thompson says, present new responsibilities to the publisher.

"Following the second world war, the export of U.S. technical literature has far surpassed records of pre-war years," he declares. "One publisher reports that his export sales for 1947 were eight times those before the war."

Food Science Study

Two Associateship courses in food science and microbiology have been approved by the governors of the Royal Technical College, Glasgow.

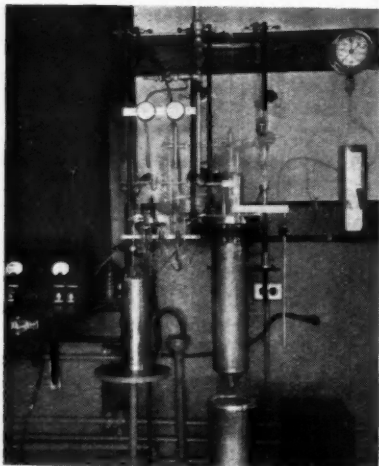
The provision of these courses was agreed upon following a report made by Prof. J. P. Todd to the committees on the Schools of Pharmacy and Bakery.

The professor pointed out that the needs of the food and fermentation industries had in the past been provided for by graduates in pure science, especially in chemistry. It was recognised as a serious problem that no specialised instruction existed for the food industry, based on microbiological processes.

In each case Prof. Todd's proposal was for a four-year course leading to the Associateship, each course requiring capital equipment costing up to £2000.

A NEW HELIUM LIQUEFIER

U.S. Progress in Low Temperature Equipment



The improved type of helium liquefier now in use at the U.S. National Bureau of Standards

IN connection with its programme of basic research on the properties of matter at extremely low temperature, where many remarkable phenomena occur, a new and usefully improved type of helium liquefier is now in use at the U.S. National Bureau of Standards. One important feature of this, resulting in greatly increased versatility, is a transfer siphon for delivering the liquid helium to an external receiver which can be easily modified to accommodate the experiment on hand.

The production of temperatures in the region near absolute zero is becoming increasingly important in many fields of scientific investigation. At the temperature of liquid helium, metals such as lead and tin, ordinarily poor conductors of electricity, become super-conductors, with a complete loss of electrical resistance.

Included in the bureau's programme of studies seeking a more complete explanation of this and other low temperature phenomena, an investigation is scheduled of the extraordinary properties of helium II near absolute zero, which seems to constitute a fourth state of matter. It is expected that information of much basic scientific interest will result from this work.

The unique low boiling point of liquid

helium (4.2°C. above absolute zero under atmospheric pressure) makes it indispensable for low-temperature research. At ordinary temperatures, no pressure, however great, will liquefy helium, and free expansion through a throttle valve causes warming rather than cooling. However, if gaseous helium is first cooled to about 20°K, the expansion produced by continuous flow through a throttle valve will result in further cooling. This was the method used by H. Kamerlingh Onnes, who first liquefied helium in 1908 at the University of Leyden.

Cooling Effect

About 16 years ago, F. Simon devised a simpler method of liquefying helium, which is utilised in the present apparatus. He filled a strong, thermally insulated container with helium at 150 atmospheres pressure. After cooling with solid hydrogen to about 10°K, the compressed helium was allowed to escape through a throttling valve. When the pressure had reached atmospheric, the container was found to be more than half filled with liquid helium.

This marked cooling effect may be explained in terms of the work done by the gas molecules remaining in the container as they push out the gas that escapes through the valve. The energy to produce this work is supplied from the internal energy of the helium, so that, as the expansion proceeds, the temperature of the gas left in the chamber falls. After the liquefaction temperature is reached, further expansion results in the liquefaction of a considerable fraction of the remaining gas.

In most earlier Simon-type instruments, the experimental chamber was a permanent part of the liquefier itself, and no provision was made for withdrawing the liquid helium. The new liquefier delivers about 210 c.c. of liquid in a single expansion, sufficient for some experiments lasting as long as 24 hours.

Monel Chamber

The heart of the new apparatus is a thick-walled monel chamber, designed to withstand a pressure of 4100 p.s.i., within which the helium is liquefied. This chamber, together with an outer jacket containing pumped liquid hydrogen, is supported in an evacuated container by a tube of low conductivity, also used for filling and pumping the hydrogen jacket. The evacuated container is surrounded by liquid hydrogen

in a sealed Dewar flask, which in turn is immersed in a flask of liquid air.

Pressure Changes

After all the inner parts of the apparatus have been cooled to liquid-air temperature by filling the hydrogen Dewar and the liquid-hydrogen compartment with liquid air, the liquid air is removed and replaced with hydrogen. Pure helium is then admitted slowly to the high-pressure chamber and the pressure rise observed.

When the pressure in the chamber reaches about 80 atmospheres, the hydrogen container is refilled and pumping started to reduce the pressure over this hydrogen. As the temperature is thus lowered, the helium pressure is brought to a maximum, about 150 atmospheres. When the temperature has been lowered to about 10°K , the helium is allowed to escape from the liquefier by expansion through a throttle valve at the end of a transfer siphon. This valve is adjusted so that the pressure falls at a moderate rate, reaching atmospheric pres-

sure in 5 to 15 minutes. When condensation conditions are reached slightly below the critical temperature (5.2°K), liquid helium forms in the high-pressure chamber and flows over through the siphon as the expansion proceeds.

After the expansion is complete, any liquid remaining in the chamber is forced over by the introduction of more helium gas. The cold helium gas that is first released serves to pre-cool the external receiver so that very little helium is lost during the transfer.

Temperatures are followed during operation of the liquefier by means of a gas thermometer having high sensitivity at low temperatures. The thermometer bulb is attached within the liquid-hydrogen jacket. The cryostat into which the liquid helium is usually transferred consists of a soda-glass helium Dewar surrounded by a Dewar of liquid hydrogen, which in turn is protected with liquid air.

Phenol and Cresol

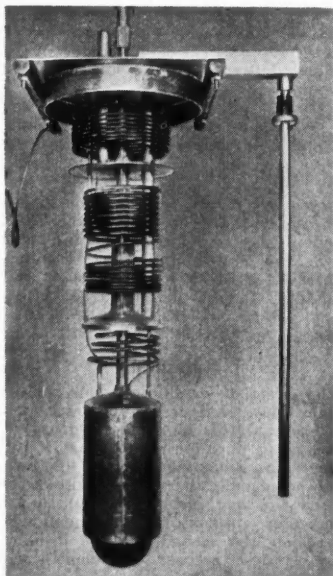
New Analytical Method

THE quantitative determination of phenol and cresol in complex biochemical samples has been facilitated through an application of the countercurrent distribution method, according to a report released by the Office of Technical Services, U.S. Department of Commerce. The result of work carried on at Camp Frederick, Maryland, by United States Army investigators, the method is expected to be useful in analytical chemical analyses for clinical, bacteriological and industrial purposes.

To make the analysis, phenolic compounds are removed from interfering solutions by distillation at pH 8.0–8.5, and the sum of the phenol and cresol is determined by the sulphanilic acid method. Phenol is then separated from cresol by submitting an aliquot of the distillate to a 24-plate countercurrent distribution. From the amount of phenol found in a selected series of tubes, the concentration in the original sample can be calculated. Cresol is determined by subtracting the value for phenol from the total phenolic content of the sample.

The fundamental basis of the countercurrent distribution method is the well-known partition of a soluble substance between two mutually immiscible phases. Although this method has been used in penicillin, other antibiotic, and antimalarial investigations, it has received only limited use in the field of analytical chemistry.

No. PB-95891, "The Determination of Phenol and Cresol in Complex Biochemical Mixtures," (photostat \$3.75, microfilm \$2) The Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D.C.



Partially assembled helium liquefier. The high-pressure liquefaction chamber at the bottom is surrounded by an outer jacket which contains the liquid hydrogen. The inverted cup at the top is the cover of a liquid-air Dewar flask

MANUFACTURE OF PLASTIC LIGNIN

Some Recent Italian Research

DURING the past ten years, research has been undertaken in the Italian University of Padua (Industrial Chemistry Institute) on the preparation of alkali-lignin for plastics. Prof. I. Sorgato, of that institute, has now added a supplement to his previous paper—read at the Brussels Congress in 1948—in which he had presented a survey of recent Italian work on lignin as a raw material for the synthetic resin compounds (*La Chim. et l'Ind.*, 1948, 30, 281-4).

Chemical Characteristics

Particular attention has been directed to retaining in the finished product the chemical and colloidal characteristics of the native material, and to acquiring a better knowledge of the different functional groups from a plastic or synthetic resin point of view.

Analytical work has already been described elsewhere in some detail (*Atti Instit. Ven. Scienze Lett. Arti.*, 1948, 56 (II), 120). The properties of the manufactured product are: (a) Solubility in water, cold, 0.03 per cent; (b) Ash, 0.5-1.3 per cent; only in rare cases is this below 0.5 per cent; (c) Methoxy groups; although it is sometimes thought that the purity of commercial lignin is to be measured by its methoxy group content. Sorgato thinks this has little significance, since this group may be unaffected by polymerisation or may be formed from non-lignitic constituents, yet it is necessary to take account of possible condensations and changes in molecular weight.

(d) Equivalent weight, or that corresponding in a hydroxyl (OH) reacting with caustic soda (NaOH); the lower the equivalent weight so much the greater the number of phenolic OH groups, and therefore also the chemical reactivity of the lignin. The values range from 300 to 400, and are closely related to (e) potentiometric titration, effected with a solution of sodium lignate; lignin behaves as a weak dibasic acid, and neutralising is done with pH 4.5-5.

(f) Dioxymethylene groups; these with thermal or acid treatment liberate formaldehyde, and are therefore present in lignin in the acetal form, probably connected with a pyrocatechol nucleus. These groups should be preserved intact, as they are a source both of phenolic hydroxyls as well as formaldehyde. The Italian lignins contain up to 3 per cent of OCH_2O as compared with 1.4 per cent found by Freudenberg with pine alkali-lignin (i.e., fused potash lignin).

As shown in the following table hot potentiometric titration with acid reduces the content:—

VARIAION IN COMPOSITION WITH ACID AND THERMAL TREATMENT.

	Laboratory prepared lignin potentiometrically titrated with H_2SO_4		Commercial lignin A moulded at 170°		Commercial lignin B moulded at 170°	
	cold	hot	cold	hot	cold	hot
Equivalent weight ...	450	420	359	264	396	243
CH_3CO per cent ...	18.1	17.1	22.6	26.1	24.8	25.3
CH_3O per cent ...	14.4	14.1	13.9	13.6	13.1	13.2
CH_3O after methylation ...	28.8	27.8	—	—	—	—
OCH_2O ...	3.2	2.7	2.8	1.0	3.1	1.1

(g) Acetyl groups—these amount to 18-26 per cent and, as already indicated, are a measure of the lignin reactivity. Commercial lignins generally have a larger number of OH groups capable of being acetylated than is the case with laboratory samples.

From the above table it will be seen that hot (80°) potentiometric titration in an acid medium should be avoided. Both potentiometric titration and filtration should be done cold.

Chemical or other changes due to heating and pressure are of considerable interest, whether the lignin is used in moulding powders by itself or in admixture with other materials. Reduction in weight due to moulding at 170° is shown in the above table. Other changes, such as appreciable reduction in OCH_2O groups, will be noted.

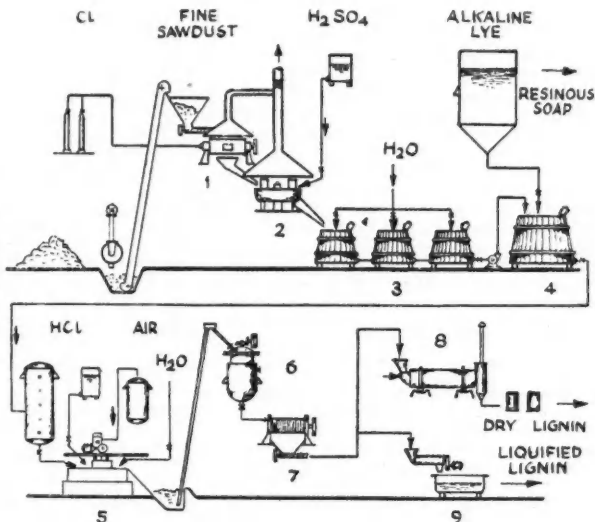
Moulding

The effect of moulding under these conditions may, in fact, be summed up as a condensation of aliphatic hydroxyls and releasing of phenolic hydroxyls. Both these changes are advantageous, the first because it increases molecular weight and reduces the number of carbinols (CH_2CO) and thus also water absorption in the moulded product, and the second because it increases reactivity with respect to condensing agents formaldehyde or furfural.

The best test for ascertaining the quality of lignin is the formaldehyde reaction. In the resinification of lignin phenol has hitherto chiefly been employed, as combined in the formophenolic resins (phenol-formaldehyde condensation), but this is not satisfactory as it only means a mixture of

PLANT LAYOUT

1, Chlorination. 2, Hydrolysis. 3, Solution of acid paste. 4, Precipitation. 5, Filtration of alkali. 6, Dehydration. 7, Filtration. 8, Drying. 9, Liquefaction.



lignin with resin without the possibility of any reactions worth speaking of.

On the other hand, lignin is reactive with the aldehyde groups, formaldehyde may stabilise the acetal bonds with aliphatic hydroxyls, and methylenic linkages with phenolic nuclei, as in the phenoplasts. The formaldehyde test consists in treating the lignin with CH_2O in suspension or dissolved as lignate, for 8 hours under reflux, potentiometrically titrating with acid, washing, drying, and pressure-moulding the formaldehyde resin.

Results vary widely according to the nature of the lignin, both in thermosetting and in mechanical properties. Sometimes this test reveals individual pieces of remarkable hardness and stability.

An outline of the industrial process states that the raw material, pine, is cut up in the usual way with the addition of a small quantity of a reducing agent, sulphite or other, to reduce oxidation. Resinous soaps are decanted off, and the lignin dissolved or peptised as lignate, potentiometrically titrated with acid without reaction between lignin and acid.

A special precipitant was used by the author, prepared from wood chips or fine sawdust or the like, partially hydrolysed with sulphuric acid, and chlorinated, using gaseous chlorine to form a heterogeneous paste, more stable against acid action. The temperature is not above 35°C ., and the time about one hour. The plasticity of the

product is good, and if that of normal saccharification is taken as 1, then that of the product is 3.

Starting with 100 parts sawdust, 10 parts chlorine, 200 parts sulphuric acid of 60°Bé , 45 parts of the product are obtained in which chloro-lignin-cellulose ratio is 1.2 to 1.5 (see Italian patents Nos. 400,744, 402,664). The acid function of the ligno-cellulose nucleus is due either to sulphonation (fixation of HSO_3) in organic groups, or to carboxyls (COOH) formed during chlorination.

The product proves to be an effective precipitant, giving improved yield and better plasticity. The ratio of the precipitant to alkali-lignin is 1:3 to 1:5. The concentration in the alkali-lignin should not exceed 3 per cent, and the precipitant should be very highly dispersed therein by means of a high-speed stirrer. The final pH should be 6.5. The potentiometrically titrated mass should be matured for about 12 hours, during which some coagulation of the colloidal dispersion takes place.

If this stage of the work has been properly done there should be little difficulty with the following filtration. Hitherto this has meant trying to deal with a completely gelatinous mess, which had to be overcome by heating and/or use of coagulants, as in the method used by the Mead Corporation in the U.S.A., which uses heating up to 90°C ., followed by rapid cooling down to 40°C .

By using a modified form of the process

described in Amati's Italian patents Nos. 398,106-7, Sorgato was able to separate the lignin by filtration in the cold without change in the lignin structure. After many attempts this was ultimately achieved with the use of porous mineral filters of special construction and with automatic controls, with a daily output of one ton of dry lignin.

The filtering cycle lasts about 25 minutes; 8 minutes for suction (aspiration), 5 for washing with dilute HCl, 10 for washing with water, 2 for aspirating out of bath, and 10 for removal of precipitant residue with compressed air and for adjusting apparatus for a fresh batch. The acid wash, with 0.1 per cent HCl or HNO_3 , is very important in eliminating more than one-third of the original salts, especially sodium sulphate, and in decomposing the sodium lignate.

A new method also for further purifying has been introduced, including a certain amount of drying, by utilising the thixotropic properties of the lignin precipitate whereby it undergoes some structural changes when heated to 40-45°C. and loses water together with some of the salts dissolved therein. On an industrial scale such heating is done gradually with gentle stirring. The lignin separates out as mud and is filtered or centrifuged.

CHEAPER SYNTHETIC CRESOL

AN inexpensive method of producing synthetic cresol and other aromatic alcohols from hydrocarbon toluene was recently demonstrated by the United International Research, Inc., Newark, New Jersey. The low price of the finished product is due to a method which enables the catalyst to be recovered.

Using a boron derivative as a catalyst, the new process synthesises toluene into a cresol above USP specifications.

Variations in the process permit the synthesis of other aliphatic hydrocarbons, such as xylol or naphthalene, into their corresponding alcohols. By further standard procedure, it is claimed, these alcohols, such as xylenol and α and β naphthol, can be processed into their fatty acids and finally processed into synthetic fats and oils.

The last stage is expensive and of no commercial value at present, but might prove useful in case of severe shortage.

Cresol is currently priced at \$1.40 a gallon, while the cost of the synthetic material will be less than \$1 a gallon. Commercial manufacture of synthetic cresol at the rate of 8000 lb. daily is planned this summer by a newly formed company, Hydrocarbon Chemicals, Inc.

A higher temperature than that just named may be used, since, working in a neutral medium, there is no risk of adverse effect on the lignin constitution, and the dehydration would be more effective. When completed, the dry matter should be about 50-60 per cent.

Further drying is not required in the Italian process, and if the wet lignin—with about 60 per cent dry matter—is now vigorously stirred at a temperature of about 50°C., a colloidal dispersion is formed with which the further treatment with resinifying agents is effected. At the same time, water is eliminated by the resin together with some of the salts formed during resinification and part of the lignin which has not been reacted.

This latter is claimed as one of the advantages of the process; others are: more intimate contact and homogeneity between lignin and resin, gradual polymerisation and more complete removal of salts with resulting increase in purity of product.

The two leading firms in Italy associated with the development of this plastic lignin process are Soc. S.I.L.L., of Milan, and Soc. E. Pessi, of Padua, which have supplemented on an industrial scale the preliminary work in the Padua University laboratories.

FRENCH OIL AMALGAMATIONS

THE recent merger between the Compagnie Industrielle des Pétroles and the French subsidiary of the Socony Vacuum Oil Co., is the fourth important amalgamation in the French petroleum industry since the war. The concentration that has so far taken place in this branch of the French economy is based on the Monnet-Plan and is designed to bring about not only an increased production in the French oil refining industry but also an improved system of distribution. The French economic authorities aim at the replacement of several medium-scale refineries by a few large-scale plants.

So far, the Raffineries de Berre, a subsidiary of the Saint-Gobain chemical group, and the S.A. des Pétroles Jupiter (a member of the Shell-Group), have been merged into the Compagnie de Raffinage Shell-Berre. Pechelbronn Ouest, S.A., and Les Consommateurs de Pétrole have been merged into Raffineries Françaises de Pétrole de l'Atlantique, and lastly, the Société Générale des Huiles de Pétrole (connected with the Anglo-Iranian Co.) has been merged with the Raffinerie de Pétrole du Nord.

SUMMARIES OF NEW PROCESSES

High Vacuum Distillation

Design to Minimise Pressure Losses

SOME important advances in the technique of high vacuum distillation are claimed in their English Patent application No. 16248/1948 (Conv. date 20.6.47) by Naam. Venn, de Bataafsch, Petro.-Maat.

Although considerable progress has been made in recent years in high vacuum fractional distillation, there still remain many difficulties. Some of these have been dealt with in various ways, as in the counter-current molecular distillation described by Keith and Madorsky (*Jnl. H.S. Bureau of Stand.* 1947, 38, 129-135). But fractional distillation capable of handling larger flows with simpler apparatus is often required.

Some of the shortcomings of existing methods may be stated thus:

(1) *Liquid heads.*—When bubbling through successive pools the liquid pressure at the surface of each pool is lower than at the level at which vapours are fed into the pool, and each plate adds to the gas pressure in the system. This effect is cumulative, so that there is undesirable high pressure at the kettle end of the column.

(2) *Vapour head.*—Vapours within the column have a finite weight and the weight of the vapour column within the distillation column results in greater pressure at the bottom than at the top.

(3) *Vapour friction.*—This is due to passage through the pools with resulting pressure drop at each stage. This, too, is cumulative, and friction is still more marked in packed columns without pools.

Vapour Energy

The present invention seeks to minimise or eliminate some or all of these sources of pressure drop. Instead of penetrating pools, or passing through narrow passages with considerable friction, the kinetic energy of the vapour is used to create large liquid surfaces. More specifically, vapour at high velocity impinges upon a liquid surface to agitate it and provide intimate contact between the vapour and liquid phases. Some vapour friction is involved in this, but is not serious.

Vapours and reflux liquid are counter-currently contacted by flowing liquid successively through a series of liquid pools and directing a vapour stream against the surface of the pools to agitate the liquid without passing through.

In one embodiment of the invention, the liquid pools are so arranged as to result in minimum elevational difference between the first and last pools, so that the liquid head and the vapour head are reduced to a mini-

mum. The liquid is transferred by gravity flow through siphon connections. This involves the use of a substantially horizontal column.

In another embodiment of the principle a vertical column is used, and pools are spaced vertically to a greater extent. Some advantages—e.g., reduction of vapour head—are sacrificed to saving of ground space; but the liquid head is minimised.

It is possible by using one of or other form of the principle to obtain pressures down to 10 mm. Hg or less at all points in the system. It may be used for high vacuum fractional distillation of a mixture of materials with relatively close boiling points, under atmospheric pressure, into two desired end products, by reducing the pressure difference or drop between the column ends.

The invention may also be embodied in an improved fractional distillation column with pressure drop between the ends less than in the columns hitherto used. Mass transfer between vapour and gas, tending towards equilibrium, is obtained by using the kinetic energy of the gas, the liquid flowing through a series of pools, and the gas (vapour) passing through a series of orifices arranged to bring about the desired agitation. (There are 14 claims.)

CANADIAN CAUSTIC SODA

AN outline of the procedure in the processing of caustic soda followed by Canadian Industries, Ltd., of Montreal, Ont., was provided recently by a spokesman of the firm, who said that the caustic soda as produced at Shawinigan Falls came from the cells at about 50 per cent strength, and if sold as a liquid, left the plant in tank cars at this stage. Sold as a solid, it went from the cells to the evaporator and from there to the pots, where heat reduced the moisture content to the point at which a splash hitting a cool surface immediately crystallised.

Light-weight steel drums, which can be ripped open, are filled with the liquid caustic, which rapidly cakes as a solid and is usually removed by tearing the drum apart. The drums hold 740 lb. of solid. If the caustic soda is to become flake, as in lye, the solution goes from the pots to a water-cooled drum, where it flakes and is scraped off. The flake is screened for size and goes for filling to the drums which hold 380 lb. of flake.

India's Fertilisers

British and American Collaboration

TANGIBLE evidence of British and American collaboration in enabling India to enlarge its home supplies of fertilisers is provided in connection with the Indian Government-sponsored \$50 million factory at Sindri, a village 175 miles north-west of Calcutta, which is stated to have an annual capacity of 300,000 long tons of ammonium sulphate.

The Power-Gas Corporation, Ltd., of Stockton-on-Tees, purchased and erected the engineering equipment supplied by the Chemical Construction Corporation, a unit of the American Cyanamid Company, by whose engineers the plant will be operated until such time as the Indian engineers are sufficiently trained to take over the management.

American Methods

This training is being given in Canada and the United States. Six Indian chemical engineers, employed by the Indian Government, recently arrived in the United States for an extended period of intensive training in the operating, maintenance, and production phases of some of North America's largest fertiliser manufacturing plants.

At the end of their training period these men are to return to India to take over the operation of the Sindri factory. It is planned that they will remain in North America for several months, to receive practical instruction in the fertiliser plants of the North American Cyanamid Company, Ltd., in Niagara Falls and Welland, Ontario, Canada. Their training will include actual operation of the plants as well as lectures and discussions on the theory and techniques of fertiliser production. Later, they will go to other plants in the U.S.A.

Productive Improvements

The new Sindri plant will, it is estimated, double India's ammonium sulphate manufacturing capacity and provide a source of fertiliser at half the cost of the imported product, which is about \$100 a ton.

The Chemical Construction Company, in addition to the Sindri plant, is stated to hold contracts abroad for an ammonia factory in the Suez Canal zone in Egypt, and a fertiliser plant in Mexico. The company is now conferring with the Indian Government on plans for the construction of added ammonium sulphate capacity and an installation for making ammonium nitrate in Mysore. It has also supplied the engineering equipment for two factories for superphosphate fertiliser production in Pakistan.

Nitric Acid Route

Dutch Research with Crude Phosphate

THE usual method for the production of phosphatic fertilisers is the treatment of crude phosphate with sulphuric acid. Other mineral acids have hitherto been thought relatively unsuitable, with the exception of Norsk Hydro process for combined manufacture of phosphatic and nitro-geneous fertilisers by treatment of the crude mineral with nitric acid.

In a doctorate thesis, at Delft University, H. R. J. Plusje discusses the possibility of treating crude phosphate with nitric acid with particular reference to the underlying theory and equilibrium diagrams for the system $\text{CaO} \cdot \text{P}_2\text{O}_5 \cdot \text{N}_2\text{O}_5 \cdot \text{H}_2\text{O}$. (*L'Ind. chim.* 1948, 35, 164-167, 187-191, 207-212).

The economic importance of obtaining simple phosphatic fertilisers and phosphates generally from nitric acid treatment is emphasised; and, although much work in this direction has been done, the basic theoretical principles are not widely understood.

Equilibrium diagrams are therefore presented and discussed in considerable detail, as well as the relevant equations. From the graphic data thus shown it is found that equilibria between $\text{Ca}(\text{NO}_3)_2$, HNO_3 , H_2PO_4 , $(\text{Ca}_2(\text{PO}_4)_2)$ and H_2O may be represented by a right prism whose base is a square, as is usually done with systems of pairs of reciprocal salts. Equilibria were thus determined to supplement those given in the literature, and graphed for temperatures of 100, 75, 50, 25, and 5° C.

Promising Approach

Such graphic representation is of great interest and importance in this particular field of research. In describing the usual mode of decomposing natural phosphate with nitric acid the true significance of the vertical section of the right prism in the natural phosphate/nitric acid reaction is indicated. This is thought to be of considerable practical importance in evolving methods for the manufacture of pure calcium phosphates (simple phosphate fertilisers, both mono- and di-calcic) from this direct reaction.

Such processes should be carried out in a closed cycle in which is added to a circulating liquid alternatively natural phosphate and nitric acid, at definite intervals pure calcium phosphate and hydrated calcium nitrate being withdrawn. Such a method for the production of dicalcium phosphate and calcium nitrate is of particular interest, since it may be carried out with the theoretical minimum of nitric acid.

ITALY'S SULPHUR PROBLEM

U.S. to Help Restore a Neglected Industry

THE critical situation into which the once prosperous sulphur mining industry in Sicily has gradually degenerated in the course of the last ten or twenty years offers a good example of the dangers inherent to certain industrial monopolies—writes **THE CHEMICAL AGE** correspondent in Anacapri, Italy. Throughout the 19th century until comparatively recent times Sicily had been practically the only large producer of sulphur in Europe, having vast deposits. This comfortable situation induced the owners of Sicily's sulphur mines to maintain a high price level, while neglecting the modernisation of production processes.

The extraordinary disparity that has developed between American and Italian production costs is clearly illustrated by the fact that nowadays the Italian Government, in order to keep at least some of the Sicilian mines going, must guarantee the industry a minimum price of roughly 30,000 lire per ton, which barely covers current expenses. At the same time, the world market price for sulphur is about 12,000 lire a ton.

Recently, representatives of the industry have submitted to the Government an elaborate programme which aims at the re-establishment of Italy's competitive capacity in the international sulphur market, through a series of reorganisation measures. By thoroughly modernising mining processes and machinery, as well as by a better and more systematic exploitation of sulphur by-

products, the industry intends to cut production costs. The plan counts on ERI assistance for the purchase of modern American machinery as well as on a loan from the Italian Government to the extent of a little more than 20 thousand million lire (roughly £10 million).

The authors of the project are confident that with this financial assistance Sicily's sulphur mines will be able to raise their output to the pre-war level of 250,000 tons per annum within the next three years, provided a sufficient outlet can be found for the by-products, mainly sulphuric acid. The plan therefore provides for the building of five plants for the production of fertilisers by new methods, and of other chemical compounds related with sulphuric acid.

Italy's commercial negotiators, meanwhile, have been able to obtain some notable successes in their dealings with other countries. The French Government has recently agreed to import from Italy 30,000 tons of raw sulphur to be delivered by July 31, 1949, and to be paid for through the existing Anglo-French clearing. Greece has bought 6000 tons of refined Sicilian sulphur, in compensation for Greek tobacco, and a Soviet delegation in Rome has signed a contract for 7000 tons of raw sulphur.

In all cases, the higher price of the Italian product, as compared with the American one, has been outweighed by the fact that no dollars are needed.

Expansion of French African Chemical Industries

WIDESPREAD expansion of chemical production is taking place in the French Union, particularly in Morocco and Algiers. More rapid development would be general, but for shortages of raw materials.

The manufacture of copper sulphate by the Sté. Saltpêtres et Produits Chimiques du Maroc, for example, is strictly limited by the quantity of metal available to the company. Only 5000 tons is being produced, about 60 per cent of productive capacity. Potassium nitrate exports, however, have been intensified.

The Société Metaux et Produits Chimiques has increased its capital from 15 to 45 million francs and is to install ovens for treating antimony, using Moroccan ore. The same company is manufacturing sodium sulphhydrate, a new product more active than sodium sulphide, used in the treatment

of minerals. Until now, the sodium sulphide used was imported.

In the southern suburbs of Algiers, at Barako, which is becoming an important industrial centre, a factory specialising in production of chemical products for agriculture was recently inaugurated. The company, the Industrielle Corporation Algérienne, specialises in insecticide and anticryptogamic products prepared from copper and sulphur, which Algerian agriculture until now has had to import.

The Société Chimique Nord-Africain Pechiney is installing a plant at Constantine for the production of copper sulphate from calcho-pyrites. At Baba Ali, the Sté. Solvay is installing a factory to produce sodium chloride for bleaching vegetable pulp, produced by the North African Cellulose Company.

LETTER TO THE EDITOR

German Scientific Instrument Prices

SIR,—The issue of *The Times* dated February 14 containing Mr. Henri Dumur's observations on my recent letter regarding unfair competition (*THE CHEMICAL AGE*, 60, 143, etc.; 248) has just reached me here in Johannesburg.

(a) I have no hesitation in repeating that the German scientific industry was built up through the aid of the German Government. Examples of this are in the triple expansion of Zeiss in 1936 and the optical instrument works of Schneider at Göttingen. One could quote many others.

Examination of the scientific instrument industry in Germany revealed that before the war they charged a higher price for their instruments in the home market, the excess over the normal price being paid into a central fund which was utilised to enable the German manufacturers to undercut in the world's markets. An examination of the accounts of some of the German firms has already confirmed this, and indeed it has been admitted in conversation with German manufacturers.

(b) Here again, an examination of the industry and conversations with the manufacturers confirmed that very little, if any, expansion of the German scientific instrument industry took place after the war was declared.

(c) This is an attempt to grossly misrepresent the rate of wages paid throughout the German scientific industry. As recently as October last year I had conversations with many German scientific instrument manufacturers in Germany who agreed that the rates of pay varied between 9d. and 1s. 9d. per hour in sterling, equivalent of 60 pfennigs to 1 Deutschmark 20 pfennigs per hour. It may well be that Leitz pay one

or two of their highly-skilled instrument makers the equivalent of 2s. 9d. per hour, but I must reaffirm that the rate in the industry generally in Germany is between 9d. and 1s. 9d. per hour, which has been confirmed by the Control Commission. I would further like to correct Mr. Dumur in his supposition that the British wage rate of 3s. for an instrument maker is the highest rate, as generally speaking it is much higher.

(d) I agree the order was placed by the Indian Government, but the matter is not of importance.

In conclusion, may I point out that while Mr. Dumur admits having received the order for 400 microscopes, he does not deny doing so at a figure of £10,000 below the lowest British tender, or, in other words, one-third lower than the British price. It is the confirmed opinion of this industry, and indeed many others, that German manufacturers are only enabled to quote at these very low rates because of their low wage rates on one hand, and the help they are getting through subsidies from the American and British Governments.

I would add that my association is pressing H.M. Government to examine this transaction, which cannot be considered to have been carried out at anything near world prices.

Finally, one must still not overlook the question of war potential. This now appears to be completely forgotten in the present policy towards Germany and Japan.

—Yours, etc., J. E. C. BAILEY,

President,
Scientific Manufacturers' Association
of Great Britain, Ltd.

More Raw Materials for German Industries

IT is expected that Western Germany's imports from the sterling area during the current six months will be of the order of £30 million, which compares with £21 million for the whole of 1948. In the same period, German exports to the sterling area are likely to be some £22 million, as against £26 million for the whole of 1948.

These are among the estimates arrived at by the discussions, just concluded, between delegates of the three western zones and U.K. trade representatives.

Western Germany will be increasing her imports of sterling area raw materials, such

as rubber and non-ferrous metals, and will resume on a limited scale imports of specialised machinery and manufactured goods from the United Kingdom. The United Kingdom will continue to obtain from Western Germany ferrous scrap, potash and other raw materials, and provision has been made for limited imports of German manufactures into the United Kingdom and, more particularly, British colonies.

The programme for the second half of this year will be discussed at Frankfurt this month.

Personal

CHARTER travelling scholarships, of a value of £300, tenable for one year, have been awarded by the Pharmaceutical Society to MISS JOAN MARY RHODES, B.Pharm., Ph.C., of Worthing, to enable her to study the conditions of pharmaceutical practice in Denmark, and, subject to his passing the final examination for the B.Sc. (Pharm.) degree of the University of Manchester this summer, to ROBERT GUEST BAKEE, of Manchester, to undertake studies in New York. The scholarships were founded in 1943 to mark the 160th anniversary of the granting of a Royal Charter to the society.

PROF. R. G. W. NORRISH, professor of physical chemistry in the University of Cambridge, will lecture for the British Council in France between March 20 and 27. He will speak in French to the Society of Physical Chemistry in Paris and the École Nationale Supérieure des Industries Chimiques in Nancy on "Some new effects of light on the combustion of hydrocarbons."

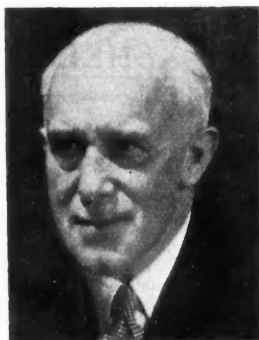
H.R.H. PRINCESS ELIZABETH has been elected an honorary member of the Royal Institution.

MR. J. FOSTER BEAVER, president of the Textile Institute, has accepted an invitation from the institute's council to stand for a second term of office, as from April 27.

MR. L. C. MACLEOD was elected president of the Society of the Plastics Industry (Canada), Inc., in the closing session of the group's seventh annual conference. He succeeds Mr. Irving D. Wintrob, of Toronto.

MR. C. S. WINDEBANK has been appointed managing director of the Esso Development Co., which conducts and co-ordinates research for the Esso group of petroleum companies in Europe. Mr. Windebank took first-class honours in chemical engineering at London University, and was awarded the M.Sc. at Massachusetts Institute of Technology. During the war he was released from the army for work on aviation fuels.

SIR ROBERT ROBINSON, president of the Royal Society, has been elected an honorary member of the Parliamentary and Scientific Committee.



Sir Robert Sinclair

SIR ROBERT SINCLAIR, deputy president of the Federation of British Industries, has been unanimously nominated president. He will in due course succeed Sir Frederick Bain. Sir Robert is chairman of the Imperial Tobacco Co., Ltd., and during the war was director-general of army requirements at the War Office and a member of the Army Council and of the Supply Council.

Obituary

The death has occurred at Paisley of **MR. MATTHEW FORREST**, of William Forrest & Son, Ltd., glue and feeding meal manufacturers, Burnbank Chemical Works, Paisley.

The death occurred last week of **MR. R. H. PARKER**, 75, proprietor of the Wharf Chemical Works, Water Street, Radcliffe, Lancs. He was a former president of the Paper makers Allied Trades Association.

The death has taken place in Dublin of **MR. G. T. RICE**, a director of Rice, Steele & Co., Ltd., manufacturing chemists, 4/7 Brabazon Street, Dublin.

MR. CHARLES H. WILSON, who was largely responsible for developing the wide use in industry of the Rockwell hardness tester for metals, and who also developed in the U.S.A. pyrometers for measuring high temperatures in industrial processes, has died at the age of 69 in Litchfield County Hospital, near his home at Norfolk, Connecticut, U.S.A. He took up the development and manufacture of the tester in 1920. To-day the Rockwell scale is the standard method of determining metal hardness.

A CHEMIST'S BOOKSHELF



Industrial Hygiene and Toxicology. Edited by Frank A. Patty. 1948. New York and London Inter-science Publishers, Inc. Vol. I, pp. xxvii + 531; 60s.

Safe working in industry is intimately bound up with a knowledge of hygiene and toxicology. The introduction of many new processing and manufacturing operations, especially during the war years, has made it still more necessary to regard conditions of safe working as matters of urgent importance. But not only have entirely new processes been introduced; many materials are now entering works for the first time, and in some cases they are materials of which we have but meagre knowledge regarding their possible effects upon the human body.

This new work, to be completed in two volumes, has been written by a group of specialists under the editorship of Mr. Frank A. Patty, who is director of the Industrial Hygiene Service, General Motors Corporation, Detroit. This first volume deals with general aspects of the subject, such as personnel; personal and environmental factors in competence and fatigue; the physiological effects of abnormal atmospheric pressure; the mode by which materials enter the human body; and their mode of action; the sampling and analysis of air contaminants; ventilation; occupational dermatoses (inflammations, ulcerations and other conditions of the skin); visible marks of occupational diseases; dangerous gases and vapours, and dangerous dusts (causing fire and explosion); respiratory protective devices; and the rôle of dust in causing occupational disease. It is sufficiently up-to-date to include a chapter on the effects of radioactivity.

One of the most interesting parts of the book is the chapter (12) in which Dr. Carey P. McCord, of the Industrial Health Conservancy Laboratories, Detroit, sets forth in tabular form (22 pp.), with useful comments, the visible marks of occupational diseases, with their probable cause and significance. The reviewer, however, has failed to find any reference to the recently revealed dangers of beryllium.

The present volume provides in 500-odd pages a wealth of information. While the subjects covered are so diverse and impor-

tant, it is a little disappointing to find that the index occupies a mere 12½ pages. Even though, as we are told in the preface, this is not a medical book, nor intended for legal reference, fuller and adequate cross references would certainly have been appreciated. Moreover, there is subject index only, and no author's index for the numerous references in form of footnotes throughout the book. Possibly, this omission may receive attention in the concluding volume. The present text is liberally supplied with references for the benefit of those who wish to pursue the subject in greater detail, although the surveys of the present 11 contributors are authoritative and based on wide experience in the several fields.

Recalling some of the conditions which are still to be found in certain branches of industry (despite factory inspectors, factory acts and works regulations); it seems that this book should be brought as widely as possible to the notice of industrial executives and boards of management; in fact, one would like to see the present publication followed by a shorter companion volume in which the main facts of dangerous conditions, their detection, and means for avoidance could alone be given for the enlightenment of the executive. Fortunately, the lessons learned during the war years have convinced many industrialists that the allocation of a percentage of profits to the maintenance of good and healthy working conditions has been an excellent insurance for maintaining production at a high level. The essential safeguards of the health and safety of employees include the provision of health and safety maintenance departments; secondly, a keen managerial interest in the subject, with full appreciation of the benefits derived from good health and safe working conditions; and thirdly, co-operative efforts among staff and operatives for establishing and maintaining those conditions. Every individual employee has a right to enjoy reasonable assurance of freedom from accidental injury or occupational disease, as also an environment which allows him to go about his work with full mental, temperamental, and physical fitness. This book may be an important factor in making those conditions more likely to be attained.—C.H.B.

Technical Publications

A CONTINUOUS rotary evaporator used in the solvent extraction of edible oils manufactured by Rose, Downs & Thompson, Ltd., Hull, is described in the firm's leaflet No. 40, just issued. The evaporator is the achievement of nearly 20 years' development by J. Bibby & Sons, Ltd., at its vegetable oil solvent extraction plants, Liverpool. It is particularly useful for solutions containing finely divided solids, where a short time contact is desired, or where apparatus of extremely small overall size is required.

* * *

The history and development of the use of fertilisers is told in an attractive illustrated booklet "Fertilisers as viewed from the Windmill Angle" published by Eerste Nederlandsche, Coöperatieve Kunstmestfabriek, Vlaardingen, Holland, and issued by their London agents Jos. Weil & Son. The story is told for the layman, rather than the technologist, but nevertheless provides a useful general background to the subject. There is also a list of commodities manufactured by the company outside the range of fertilisers, including fluorides and phosphates.

OIL RESEARCH

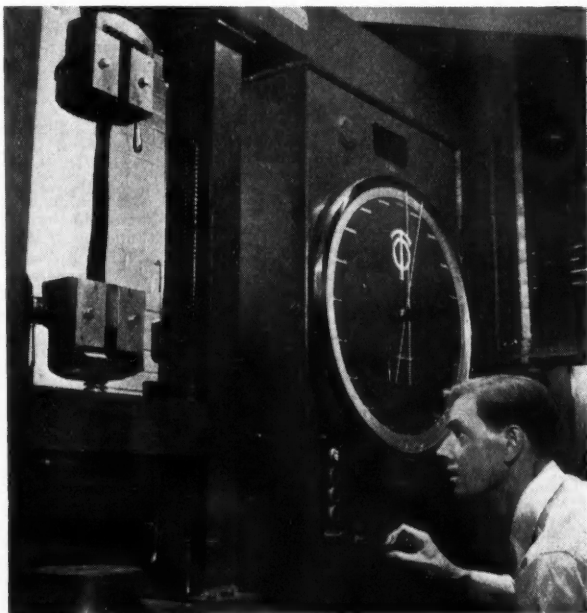
Testing the tensile strength of a sample of butyl-covered glass cloth, to be used as a lining for an irrigation ditch—one of the many varied tasks undertaken in the laboratories of the Esso Research Centre of the Standard Oil Development Company, New Jersey. The growth of the research activity of the company is told in a well-illustrated pamphlet recently issued. Work began in 1919 with a staff of 26 persons. Today there are approximately 2000 personnel including technologists. The number of oil by-products is continually being enlarged and their structure improved

The International Institute of Welding, founded last year with the support of the welding societies of 11 countries, announces the approaching publication of a quarterly "Bibliographical Bulletin for Welding and Allied Processes." Its preparation and printing have been undertaken by the French Institute of Welding, and all members of the International Institute are co-operating in furnishing abstracts of welding literature published in their own countries. It will be printed in English and French and publication is expected to begin in April. Distribution here will be by the Institute of Welding and the annual subscription will be £2 5s. or £1 6s. 6d. for those belonging to member societies of the International Institute of Welding.

* * *

Two effective aids to the packaging of small metal objects have just been introduced by Croda, Ltd., Snaith, Goole, Yorkshire, in the form of new plastic coatings which form a complete protection against rust. "Crocell" applied hot, dries imme-

(Continued overleaf)



diately and forms a thermoplastic skin impervious to corrosion, which also has considerable cushioning properties against knocks and abrasions. It is easily removed by slitting and leaves a film of fine oil exuded during storage. "Lowerite" is a plastic type anti-corrosive of similar basic properties, but is applied cold, and requires about one hour to dry to a transparent film.

* * *

A technical symposium on printed circuits was held last year by the U.S. Aeronautical Board's Aircraft Radio and Electronics Committee under the technical supervision of the National Bureau of Standards. Twenty-two papers were presented on this rapidly developing electronics field, and these have now been published in a booklet "New Advances in Printed Circuits" (N.B.S. Miscellaneous publication M.192). Topics presented by representatives of industry and Government laboratories include: vitreous-enamel di-electric products; printed

electronic components on glass, plastics and other non-conductors; mechanisation of electrical wiring. There are 73 pages, 43 illustrations and six tables.

* * *

Shortage of vegetable and animal oils has resulted in considerable research, one result of which is the "Estax" products which are in the class of hydroxy esters (with further radicals in some cases). Considerable economies are claimed by the use of these esters, for example, 0.25 per cent "Estax 29" has been found to replace 8 per cent rape oil. A list of these non-ionic esters has just been issued by the Watford Chemical Co., Ltd., London.

* * *

A new list of organic chemicals containing 1200 items, including over 500 chemicals new to the catalogue, is now available from L. Light & Co., Wraybury, Middlesex. Chemicals are classified in three approximate grades of purity.

NEXT WEEK'S EVENTS

MONDAY, MARCH 21

Textile Institute. (Lancashire Section). Manchester: 16, St. Mary's Institute, 7.15 p.m. Annual general meeting.

Royal Institute of Chemistry. (London and South-Eastern Counties Section). Dartford: County Technical College, Essex Road, 7 p.m. E. C. Wood: "Quantitative Common Sense and the Chemist."

Institution of Works Managers. London: Waldorf Hotel, 6.45 p.m. T. H. Threlkeld: "The Factories Act"

TUESDAY, MARCH 22

Society of Glass Technology. Manchester: Two-day meeting: visit of Parent Society.

Royal Institute of Chemistry. (London and South-Eastern Counties Section). Dagenham: South-East Essex Technical College, Longbridge Road, 6.30 p.m. J. L. Edgar: "Modern Methods of Organic Solvent Manufacture."

Institute of Fuel. London: Institute of Mechanical Engineers, Storeys Gate, S.W.1. 2.30 p.m. Discussion of the Report on District Heating by the Ministry of Fuel and Power Mission to Study American Practice.

Institute of Welding and the British Welding Research Association. Ashorne Hill, near Leamington Spa: Four-day conference: "Welding as an Aid to the Saving of Steel and Manpower." (Details appeared in THE CHEMICAL AGE, 60, 360.)

WEDNESDAY, MARCH 23

Society of Chemical Industry (Food Group). London: Nutrition Panel meeting. Prof. J.

Beattie: "Effect of Non-Protein Calories on the Utilisation of Proteins."

Institution of Electronics. Manchester: Reynolds Hall, College of Technology, 6.30 p.m. S. Rodda: "Photo-multipliers"

British Ceramic Society. (Refractory Materials Section). Cardiff: Spring meeting (two days). Technical papers and visits to works and foundries.

THURSDAY, MARCH 24

The Chemical Society. Manchester: Engineers' Club, 6.45 p.m. Joint meeting with RIC and SCI. Prof. M. Stacey: "The Chemistry of the Deoxy-sugars."

Royal Institute of Chemistry. (London and South-Eastern Counties Section). Mitcham Junction: Material Research Laboratory, Philips Electrical, Ltd., New Road, 6.45 p.m. J. S. Anderson: "The Chemistry of Semiconducting Solids."

Institute of Metals. (Birmingham Local Section). Birmingham: James Watt Memorial Institute, Great Charles Street, 6.30 p.m. Films on steel making and on the manufacture of tungsten carbide.

The Royal Society. London: Burlington House, W.1. 4.30 p.m. Discussion: "Physics and chemistry of hydrocarbon gels," to be opened by Prof. E. K. Rideal.

FRIDAY, MARCH 25

Institute of Fuel. (Scottish Section). Glasgow: I.E.S., 6 p.m. R. P. Towndrow: "Blast-furnace Practice."

The Royal Institution. London: 21, Albemarle Street, W.1. 9 p.m. Prof. F. A. Paneth: "Whence Come Meteorites? Views Ancient and Modern."

SCOTTISH FLUORINE ALLEGATIONS

Interdict Against Aluminium Co. Postponed

IN consideration of "the major public interest involved" and an assurance that the respondents will undertake "with all possible expedition" remedial alterations to their aluminium plant at Fort William, Lord Birnam in the Court of Session, Edinburgh, last week postponed pronouncement of a decree of interdict, although finding for the petitioners.

The petitioners, Joseph William Hobbs (58), managing director of Ben Nevis Distillery (Fort William), Ltd., Lochy Bridge, Fort William, and tenant-occupier of Lochy Castle and policies, and the Ben Nevis Distillery (Fort William), Ltd., sought to interdict the North British Aluminium Company, Fort William, from manufacturing aluminium in such a way as to allow noxious vapours to pass over the estates (THE CHEMICAL AGE, 59 778, 847; 60, 250, 251).

In his judgment Lord Birnam said that in brief the petitioners' complaint was that the escaping fumes were resulting in damage to cattle, trees, and other property.

Closing the factory, however, even temporarily, would do serious injury to their business and throw large numbers of people out of work. The factory produced approximately 72 per cent. of the total output of aluminium in the United Kingdom.

The petitioners did not seek to prevent the respondents from manufacturing aluminium. All that was asked was that they should carry on its manufacture so that no noxious vapours passed over the petitioners' land.

Lord Birnam considered that the respondents had not at first realised that harm might be done to neighbouring property by allowing fumes to escape uncleaned of their fluorine content.

Since 1929

It was clear, however, that fumes had been escaping since 1929; that they were scarcely visible until 1938, because they were not until then mixed with a tarry vapour; that in that year the number of furnaces was practically doubled, and for the first time fluorine-laden fumes were accompanied by large volumes of tarry vapour; and that, in 1942, a further large addition was made to the factory, with a corresponding increase in the volume of fumes escaping. Photographs, he said, had shown that the vapours "spread like a cloud" over the surrounding territory.

Of the evidence alleging injury to cattle, Lord Birnam said that the respondents now admitted that the great majority of the cattle examined on their behalf had been

injuriously affected as a result of the factory operations, and that this in itself constituted a nuisance in law.

Of the damage to trees, Lord Birnam said that the confers especially had suffered and were suffering severely from the effects of fluorine poisoning, and nearly all coniferous trees were either dead or dying. It was significant that the greatest damage had been caused to the confers whose foliage was exposed all the year round. He was of the opinion that the fumes from the respondents' factory had been at least an important contributory cause of the damage complained of.

Urgency

He would have had no hesitation in granting immediate decree of interdict but for the major public interest involved. In the circumstances of the present case, however, where the nuisance need never have existed and where the remedy, however expensive, lay ready to hand, his Lordship was of opinion that even considerations affecting the public interest should at most warrant some delay in pronouncing decree of interdict pending the necessary remedial operations being carried out with due expedition and with a proper sense of urgency.

He noted, however, that the respondents had already had several years to carry out the necessary alterations, and had only now commenced them. It was fair to say that the delay could not be attributed to the individual engineers and officials concerned so much as to the fact that the respondents, or, at all events, their parent company, were a large, monopolistic concern, and that the various suggestions and counter suggestions for dealing with the fumes had to pass through many hands before any executive action was taken.

One of the excuses put forward for the delay was the difficulty of getting the necessary supplies of steel and other materials. But if, as his Lordship did not doubt, the Ministry of Supply would find it inconvenient to have the supply of aluminium stopped because of the nuisance which the respondents' operations were causing at Fort William, he had difficulty in believing that the materials necessary for the remedial measures would not be made available to the respondents if they presented the matter to the Ministry in the proper light.

In the whole circumstances, his Lordship was prepared, though with considerable reluctance, to postpone pronouncing decree of interdict for the present and to confine the cause. He did so, however, upon the assurance given by counsel for the respondents that the remedial operations which had now been put in hand would be carried out with the utmost possible expedition.

Provision was made for the petitioners to inspect the progress of the work from time to time.

Vitamins and Hormones: New Scottish Project

A CHEMICAL laboratory which will aid the industrial development of Scotland was opened at Newhouse Industrial Estate last week by the Secretary of State for Scotland, Mr. Arthur Woodburn.

The laboratory, designed to manufacture synthetically vitamins and the whole range of hormones, has been taken over by Organon Laboratories, Ltd., the Anglo-Dutch concern, which specialises in research work. The present staff numbers 100 and it is expected that ultimately 400 will be required, some 10 per cent of whom will be research workers.

Mr. L. F. van Swaneberg, speaking at a luncheon which followed the opening, said that the Dutch business of Organon N.V. of Oss, from which the new firm originated, operated a chain of research units, not only on their own premises, but in hospitals and universities throughout the world, the work being directed by an international committee. Belief in the Scottish educational system being able to turn out the type of young people required to perform the accurate work needed had prompted the establishment of this factory in Scotland.

Home News Items

Gas Research Information.—The Intelligence Section of the Gas Research Board has removed from London, S.W.7 to "The Abbey," Southend Road, Beckenham, Kent. (Beckenham 5015).

Edinburgh Royal Society.—Five women were among the 25 new Fellows elected at the meeting last week of the Royal Society of Edinburgh. This is the first occasion that women have been so honoured.

Rotenone Wanted.—The Board of Trade Sundry Materials Branch, 8-10 Old Jewry, London, E.C.2, invites offers for 58 tons of derris and barbasco root, for immediate delivery ex London store, with a reputed rotenone content of 2.9 per cent.

Plastics Exhibition.—A display of goods manufactured in polythene and PVC is to be held by Rediwell, Ltd., at its head office, Carlton House, Regent Street, London, S.W.1 (Room 206), from May 2-13, and will be open from 11 a.m. to 5 p.m. Admission is by invitation.

Grants for Oxford.—Grants totalling £270,000 have been accepted by Oxford University from the University Grants Committee. Of this sum £193,000 is to be devoted to the erection of a physiology laboratory and the balance to alterations and adaptations of existing university departments.

Fluorosis.—Workers in the British Aluminium Co., Ltd., plant at Fort William have lately held meetings to urge that fluorine fumes should be scheduled as a source of potential danger to workers. Union representatives pointed out that there was no real evidence to show that fluorosis should be treated as an industrial disease.

Adapting Atomic Power.—The great opportunities and responsibilities of young engineers in assisting to harness atomic power to the service of humanity and industry instead of letting it become an instrument of destruction was emphasised by Lord Dudley Gordon in his address at the annual dinner recently of the Aberdeen Association of Civil Engineers.

Chemical Works Fire.—Showers of burning tar acid fell from the 80-ft. boiler of a tar acid plant after an explosion at the Glasgow Corporation's Provan Chemical Works, Royston Road, Glasgow, on March 10. Two workmen in the control house of the plant managed to escape in time to avoid the rain of acid. The nature of the blazing mixture precluded the use of jets of water, but the flames were soon quelled by spraying.

Steel Salvage.—To help the scrap steel supply position, the Ministry of Transport is sponsoring an arrangement to offer a higher price for disused tram rails to induce municipalities to raise disused tracks.

First Aluminium School.—The first school in Britain to be built of aluminium was opened at Bristol last week by Mr. George Tomlinson, Minister of Education. The construction took only nine months and cost £190 a place.

No Tax on Enterprise.—An interesting Inland Revenue decision is announced by Dunlop: that reasonable awards for suggestion schemes are not liable to income tax unless the suggestions are part of the employee's regular duties.

Sperm Oil Now £60 per ton.—The largest reduction of any in Government-controlled oil prices has been announced by the Ministry of Food, relating to sperm oil. The official price as from March 6 is £60 per ton, which compares with the figure of £102 previously in force.

Lead Mining Stock.—The Coldberry Lead Co., Ltd., are to begin lead mining at the old Coldberry Mine near Middleton-in-Teesdale, where within a few months about 30 miners will be employed. It has taken the Coldberry Lead Co. 18 months to get all the permits needed for steel and equipment.

Penicillin by Air.—One of the largest consignments of penicillin to leave Britain by air for Italy left Bovington airfield on March 12 in a specially chartered Dakota of British Nederland Air Services. Two and a half tons of the drug, from the Glaxo Laboratories, Ltd. Greenford, for Milan, took up the whole of the freight space in the aircraft.

Change of Address.—The Mond Nickel Co., Ltd., announces that on March 28, 1949, it is moving its head offices from Grosvenor House, Park Lane, London, W., to Sunderland House, Curzon Street, which, after that date, will also be the address of Henry Wiggin & Co., Ltd., and Mond Nickel (Retirement System) Trustees, Ltd. (Telephone: Grosvenor 4131).

Plastic Wallpaper.—Thin plastic sheeting which can be used as wallpaper is being produced experimentally by Arnolite, Ltd., at its new factory on the Port Glasgow Industrial Estate. The factory is also in full-scale production of a range of plastic polishes for the furniture manufacturing industry. The present policy is to treat the timber in its factory and to sell the finished timber to the makers-up.

PARLIAMENTARY TOPICS

Linseed Oil Prices.—Mr. A. R. Hurd asked the Minister of Food why he is charging paint manufacturers in this country £180 a ton for linseed oil while competing firms in Germany are able to buy at £100 a ton. Mr. Strachey said: Our selling price for linseed oil, which has been reduced to £170 per ton from March 6, is based on the cost of imported materials. I have no information about linseed oil prices in Germany. Asked by Mr. Hurd if he could hold out any hope that our own manufacturers would be allowed to buy at the world price, Mr. Strachey said: The prices at which we are buying linseed oil are tending to fall, and, of course, we shall pass on the benefit of that fall to our own manufacturers. Sir Frank Sanderson asked the Minister of Food if he could state the amount purchased and the price paid in his recent purchases of linseed oil. In view of the fact that a further break in price was confidently anticipated, would he give the House an undertaking that he would enter into no long-term contracts, even with a break clause? Mr. Strachey replied that he could not give such an undertaking, but they would be most careful about future commitments.

German Synthetic Oil.—Sir W. Smiles asked the Secretary of State for Foreign Affairs what was the cost to the United Kingdom of supplying oil to the bizonc of Germany and if any of the synthetic oil plants in Germany were now working. Mr.

Hector McNeill, in a written reply, said the cost was nil. Since October, 1947, the cost had been borne exclusively by the U.S.A. The production of synthetic petrol and oil in Germany was prohibited. At the present time two plants using the Fischer Tropsch process were producing primary materials for the manufacture of fatty acids and synthetic detergents for the soap and washing powder industry, and permission had been given for two plants originally erected for the hydrogenation of coal by the Bergius process to be used to a limited extent for the hydrogenation of residues obtained from the initial refining process of imported crude oils and the production of synthetic ammonia.

Potash Fertilisers.—In reply to questions from Mr. A. R. Hurd, Mr. T. Williams, Minister of Agriculture, said he was not aware of any serious shortage of potash fertilisers at present. During the first eight months of the current fertiliser year greater supplies than ever before had been made available and arrangements were being made for further imports in time for spring sowing. He was equally satisfied that the supplies for the first eight months of this cropping year would be 29 per cent more than for the previous year.

German Iron and Steel Scrap.—Replying to a question by Mr. G. M. Sharp, the Minister of Supply (Mr. G. R. Strauss) said the total imports of iron and steel scrap from Germany in 1948 were 856,976 tons.

NEW CHEMICALS AT BIF

AMONG the exhibits classed as inventions and discoveries at the forthcoming British Industries Fair, the display in the chemicals section at Olympia, London, of Boots Pure Drug Co., Ltd., will include a substance, at one time regarded as a possible "war gas," which has been found valuable in the treatment of three diseases.

Known as DFP (di-isopropylfluorophosphate), the substance was never used for its original purpose, but it has served in the treatment of (1) glaucoma—a disease due to increase in the fluids of the eyeball which raises intra-ocular pressure; (2) myasthenia gravis—a disease characterised by progressive muscular weakness; (3) paralytic ileus—paralysis of the small intestine. Treatment for glaucoma takes the form of applying DFP in arachis oil as eye-drops. For myasthenia gravis the DFP is administered by injection.

BRITISH STANDARDS

TWO new British Standards, one for sampling non-ferrous metals and one for cellulose acetate moulding materials, and a revised British Standard for animal glue for wood (BS 745), have been issued by the British Standards Institution.

General guidance in sampling non-ferrous metals (B.S. 1499) is intended as an aid until British Standard methods of sampling and analysis have been issued in respect of all the major non-ferrous metals.

British Standard 1524 for cellulose acetate moulding materials is a further development in the series of British Standards for plastics moulding materials. Others available are: BS 771:1948 synthetic resin (phenolic); BS 1322:1946 synthetic resin (aminoplastic), and BS 1493:1948 polystyrene moulding materials. The new standard lays down further optional requirements for electric strength and impurities, and colour bleeding.

Overseas News Items

Falling Lead Prices.—A further reduction in U.S. lead prices, which last week dropped from 21.5 to 19.5 cents, was foreshadowed by this week's decision of the American Smelting & Refining Company to cut its price to 18 cents.

Australian Steel.—The output of ingot steel in Australia in 1948 was 1,157,900 tons, which compares with a theoretical capacity of 1.75 million tons. The country's total output was inadvertently stated here last week to have been 11 million tons ("Steel Decline Disturbs Australia.")

U.S. Copper Output.—Copper output in the U.S.A. amounted last year to 825,666 tons, or three per cent less than in 1947. The hope to reach a figure of about 875,000 tons, was frustrated by a strike in Utah, which resulted in the loss of some 50,000 tons. The chief producing states are Arizona 372,000 tons, Utah 226,921 tons, and New Mexico 70,323 tons.

Australian Research Council Reorganised.—A bill changing the name of the Council of Scientific and Industrial Research to the Commonwealth Scientific and Industrial Research Organisation has been introduced in the House of Representatives, Canberra. The Minister for Defence, said that the reorganisation had been discussed with leaders of the CSIR and visiting scientists including Sir Henry Tizard and Prof. Marcus Oliphant.

Fertiliser from Garbage.—A new corporation in San Salvador, the "Abonos Organicos, S.A." has obtained a Government concession to build organic fertiliser plants for the conversion of garbage by bacterial methods. A plant of this type was established in Santa Ana in 1947 and its output, averaging 20 to 25 metric tons daily, is contracted for months in advance. It is estimated there will be enough material in San Salvador to provide ultimately 100 tons of fertiliser daily.

Belgian Drugs for U.S.A.—Two pharmaceutical products, developed by the research department of the Union Chimique Belge, Brussels, are to be introduced to the U.S. market, the firm states. They are Dicuprene, a complex eupro-oxy-quinoline sulphionate of diethylamine, for the treatment of rheumatism, and Hista-phene, a synthetic organic compound for the treatment of hay fever and similar allergies. Results obtained with intra-muscular administration of Dicuprene will be presented for the first time at the International Congress on Rheumatic Diseases, to be held in New York City on May 30.

U.S. Plant for Ecuador.—The Columbia Match Company, of Mentor, Ohio, has received authorisation to supply a match factory to Ecuador. It will cost some U.S. \$273,000 and the plant is to be ready for delivery within seven months.

International Fair.—The Lyons International Fair will be held from Saturday, April 23, to Monday, May 2, and will be open daily from 8 a.m. to 6 p.m. There will be 58 trade groups and exhibits from the U.K., U.S.A., Belgium, Holland, Italy, Sweden, Switzerland and Turkey. The chemical industry is represented in group 13 on the second floor.

"Atmospheric" Clock.—A new clock, of which one model has lately reached South Africa from Switzerland, employs as its power source the thermal expansion and contraction of a vapour in a bellows-like container in response to atmospheric temperature changes. One temperature change of 2° F. is said to be sufficient to keep the clock going for 100 days.

Lower Swiss Exports.—Official Swiss figures show that exports for January have not maintained the high level of December, 1948. Expressed in million Swiss francs, the value of shipments of industrial chemicals fell from 7.9 to 4.7, aniline dyes and indigo were down to 17.7 (31.7), pharmaceuticals declined from 21.8 to 18.8 and perfumery from 2.8 to 2.2. However, all these figures are substantially above the 1938 level.

Fluoride from Mine Waste.—Pilot plants are reported to have been established in Crittenden and Livingston Counties, Kentucky, U.S.A., for the concentration of fluoride from tailings and mine waste. Recovery of metallurgical grade fluoride is obtained by the usual mineral-dressing processes and is said to require only flotation, and in some cases combinations of crushing, grinding, de-sliming and flotation, to obtain satisfactory concentrates.

Queensland Oil Discovery.—Geological indications of oil discovered by the Shell Company in Central Queensland, Australia, point to the existence of a deposit capable of commercial development, according to the Australian News and Information Bureau, New York. Following exploratory boring, the Shell Company is reported to be ready to sink a 12,000 ft. well near Rolleston, where geologists report the discovery of rock formations comparable with those of the richest oil-bearing areas in other parts of the world. A refinery costing more than £1 million is to be built by Shell at Geelong, Victoria.

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

HARTLEYS CHEMISTS, LTD., Nelson (Lancs.). (M., 19/3/49.) February 7, three charges, to District Bank, Ltd., each securing all moneys due or to become due to the bank; respectively charged on Overlea, Tockholes Road, Darwen, Spring Bank Works, Every Street, Nelson, and plot of land at Every Street, Nelson. *Nil. May 15, 1948.

SIMONSWOOD MANUFACTURING CO., LTD., Kirkby (Lancs.). (M., 19/3/49.) February 2, £1800 charge, to City of Liverpool charged on land at Kirkby Trading Estate Kirkby, with buildings, etc., thereon known as FA.05 and 8E16 with fixed factory plant and fixtures.

Receivership

J. PHILLIPS & Co. (NOTTINGHAM), LTD., Manufacturers of paints, enamels, varnishes, etc., 171 3 Woodborough Road, Nottingham. (R., 19/3/49.) Mr. Louis W. Fuller, C.A., of 18 Low Pavement, Nottingham, was appointed receiver and manager on February 12, under powers contained in debenture dated February 24, 1948.

Company News

Boots Pure Drug Co., Ltd., has declared an interim ordinary dividend for the half-year ending March 31, 1949, of 10 per cent, less tax.

The following increases of capital are announced: **William Mather, Ltd.,** from £20,000 to £40,000; **Jenolite, Ltd.,** from £1000 to £5000; **Smith & Walton Ltd.,** from £109,520 to £200,000.

Net income and sales of the **Monsanto Chemical Company** last year were the largest in its history. Sales (excluding those of the British and Australian subsidiaries), rose by \$18,206,280 to \$161,609,441. Net income totalled \$18,042,473 (\$15,263,424). New facilities erected last year increased the plant account from \$70 million to a'm'st \$150 million.

The name of **Refinery (Holdings), Ltd.,** has been changed to **Manchester Oil Refinery, Ltd.,**

Union Carbide and Carbon Corporation's net income in 1948 totalled \$101,335,053 after charges and taxes, as compared with \$75,666,792 in 1947. The company's sales volume last year—\$631,619,557—was the largest in its history.

New Companies Registered

F. Ashwell & Co., Ltd. (465,519). Private company. Capital £1000. Manufacturing and research chemists, general and chemists' sundriesmen, etc. Directors: Archibald D. Gibbs, Francis J. Williams and Lionel E. D. Gibbons. Reg. office: 171, Lea Bridge Road, Leyton, E.10.

Cluny (Savon), Ltd. (465,510). Private company. Capital £1500. Manufacturers of, and dealers in, cosmetics, beauty preparations, soaps, perfumes, etc. Directors: Charles E. Carter and Albert C. Horstman. Reg. office: 10, Albemarle Street, W.1.

G. Fenton, Ltd. (465,344). Private company. Capital £2500. Objects: To acquire the business of a manufacturer of metal and plastic materials carried on by Gabriel Fenton at 7, Shepherds Bush Road, W.6, and 233-5, Westbourne Grove, W.11. Directors: G. Fenton, G. I. Fenton. Reg. office: 233-5 Westbourne Grove, W.11.

Marian and Walmsley, Ltd. (465,432). Private company. Capital £3000. Manufacturers of organic materials, fertilisers; research workers, etc. Directors: W. Walmsley, S. Marian. Reg. office: 24 Union Road, Exeter.

W. Naumann & Sons, Ltd. (465,598). Private company. Capital £50,000. Essential oil merchants and brokers, manufacturing and general chemists, etc. Directors: Ludwig Naumann and Wm. Naumann. Reg. office: 40, Charterhouse Square, E.C.1.

Selocel, Ltd. (465,438). Private company. Capital £1000. Manufacturers and refiners of oils and oleaginous compounds, etc. Directors: A. Sells, W. G. Pearson. Reg. office: 12 Devonshire Row, London, E.C.2.

Chemical and Allied Stocks and Shares

REACTIONARY conditions again prevailed in stock markets, a rally in rubber shares and continued firmness of British Funds being the only exceptions. With buyers showing extreme caution, awaiting the Budget, moderate selling again brought down prices on a wide front, and anticipation of the White Paper Economic

Survey for 1949, which will be published by the time these notes appear, was also a distraction. Abolition of further controls means increasing competition in many industries as individual companies endeavour to maintain profits and dividends.

Imperial Chemical came back to 44s. 9d. with the general trend in industries. United Molasses declined sharply to 42s. 9d., Dunlop Rubber fell heavily to 66s. 3d., Courtaulds were 36s. 4½d. and Turner & Newall 78s. 7½d. Fisons have been active on the big advance in profits shown, but at 58s. followed the general downward trend. Albright & Wilson were 30s. 3d., Amber Chemical 2s. shares 8s. 6d., while British Glues & Chemicals moved back to 18s. 6d., and elsewhere, Monsanto Chemicals were 55s. 7½d. Dealings started in Brotherton & Co's 10s. shares at 20s. 3d., a premium of 2d. over the issue price.

British Aluminium at 48s. 9d. were easier, British Oxygen steady, with business around £5, but Pinchin Johnson fell back to 45s. 3d., paint shares generally being lower again; Goodlass Wall were 34s. 6d., International Paint 27s., and Lewis Berger 4s. units 27s. 6d. In other directions, General Refractories were 23s. 6d., pending payment of the dividend; the big jump in profits and higher total dividend have exceeded the best market estimates.

British Xylomite receded further to £47, but elsewhere, British Industrial Plastics 2s. shares rallied slightly to 5s. 9d. De La Rue moved down to 34s. 4½d. British Match (31s. 6d.) remained depressed, Borax Consolidated were 53s. 1½d. and Amalgamated Metal eased to 19s. 10½d., the set-back in the U.S. price of lead being regarded in the market as a prelude to a reaction in other base metals. International Nickel were firm on the financial results and details of the company's big production. Zinc Corporation have been easier at £5½, although details of the £20 million scheme for consolidating the group into the new Consolidated Zinc Corporation company created a good impression. The new company also plans a public issue of 2.5 million 4½ per cent cumulative £1 preference shares. The group is also one of the world's largest producers of sulphuric acid, one of the constituent concerns being the Imperial Smelting Corporation.

Iron and steels were characterised by steadiness in shares of companies scheduled for nationalisation, take-over values governing their market prices. Elsewhere, Babcock & Wilcox were down to 68s., T. W. Ward 65s. 3d. and Wm. Cory fell afresh to 84s. 6d. on fears that the National Coal Board may plan expansion of its activities to coal distribution.

The 4s. units of the Distillers Co. eased to 26s. 6d., Associated Cement were 78s. 6d., and British Plaster Board 22s. 1½d. Triplex Glass 10s. shares have been steady at 22s. 9d. Boots Drug eased to 52s., Sangers were 33s. and Beechams deferred 16s.

Oil shares after declining rallied moderately, including Anglo-Iranian, which, however, later reacted afresh to £7½. Shell were 66s. 3d., Trinidad Leaseholds 22s. 6d. and Wakefield rallied to 70s.

British Chemical Prices

Market Reports

CONDITIONS in the industrial chemicals market are unchanged both as regards prices and the general movement of supplies. New business is on a moderate scale and buying, although not brisk, is steady. The absence of pressure in the demand is thought in some quarters, to be due not to a falling off in consumption but to the buyers being aware that the supply position is easier. A steady demand persists for most of the soda products and an increased inquiry has been reported for bicarbonate of soda. Similar conditions prevail for the potash chemicals as has been reported during recent weeks, while formaldehyde, hydrogen peroxide and white powdered arsenic are all in good request. The coal-tar products market continues unaltered and pitch is again an active item. Offers of refined naphthalene are readily taken up and the pyridines are a good market.

MANCHESTER.—In most sections of the Manchester chemical market buying interest has lately been fully maintained. The demand for soda ash and other alkali products from home consumers has been steady and offers of most of the potash compounds are being fully absorbed. Many other items, both light and heavy, are being taken up in good quantities and a fair amount of replacement buying has been reported during the week. On the export side, actual shipments are going forward steadily and fresh inquiry is being dealt with. Fairly active trading conditions prevail in the leading fertilisers and in the tar products.

GLASGOW.—There has been a notable shortage of supplies of disodium phosphate in the Scottish chemical market. It is understood, however, that this is likely to be only of a temporary nature. The demand for all classes of chemicals has been well maintained and the increase in demand for hydrated lime has continued. The export market has continued to be active and to yield satisfactory business.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patent Office, Southampton Buildings, London, W.C.2 at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Synthetic chlorinated amide waxes and wax compositions.—British Thomson-Houston Co., Ltd. July 4, 1945. 615,687.

Colour characteristics of polymers.—E. I. Du Pont De Nemours & Co. July 13, 1945. 615,688.

Deposition of metals by electrolysis.—Hudson Bay Mining & Smelting Co., Ltd. Sept. 4, 1945. 615,360.

Manufacture of polymeric nitrogen-containing compounds.—Imperial Chemical Industries, Ltd., G. D. Buckley and N. H. Ray. July 31, 1946. 615,363.

Composite materials.—Imperial Chemical Industries, Ltd., and W. F. Smith. Aug. 2, 1946. (Addition to 583,862). 615,589.

Production of poly-pentaerythritols.—Imperial Chemical Industries, Ltd., S. F. Marrian and A. McLean. Aug. 2, 1946. 615,370.

Process of separating alloys.—Spolek Pro Chemickou a Hutni Vyrobu Narodni Podnik. July 8, 1940. 615,590.

Process for the catalytic synthesis of hydrocarbons.—J. C. Arnold (Standard Oil Development Co.) Aug. 6, 1946. 615,381.

Colouring matters of the azamethine series.—Imperial Chemical Industries, Ltd., and W. O. Jones. Sept. 7, 1946. 615,697.

Process for bleaching materials made of or containing polyvinyl derivatives.—Soc. Rhodiacea. Aug. 13, 1945. 615,385.

Method and apparatus for converting continuous filaments into spinnable slivers.—American Viscose Corporation. April 6, 1946. 615,387.

Production of lactices.—Anchor Chemical Co., Ltd., and K. C. Roberts. Aug. 12, 1946. 615,395.

Polymers.—J. Downing. Aug. 12, 1946. 615,398.

Glass composition.—British Thomson-Houston Co., Ltd., and J. E. Stanworth. Aug. 19, 1946. 615,592.

Bleaching of cellulosic matter.—Palestine Potash, Ltd., R. Bloch, K. Goldschmidt, P. Goldschmidt and I. Schnerb. Dec. 10, 1946. 615,604.

Azo dyestuffs.—Imperial Chemical Industries, Ltd., W. F. Beech and M. Mendoza. Dec. 30, 1946. 615,606.

Diagnostic compositions.—Miles Laboratories, Inc. July 3, 1940. 615,559.

Manufacture of linear nitrogen-containing polymers.—H. Dreyfus. Aug. 3, 1939. 615,884.

Method and apparatus for clarifying lubricating and cooling liquids.—H. G. C. Fairweather. (American Cyanamid Co.) May 28, 1943. 615,705.

Process for the recovery of valuable constituents from yeast, etc.—L. N. Cox. Nov. 20, 1944. 615,891.

Valves for the control of liquids and gases.—Electrol, Inc. Sept. 30, 1943. 615,974.

Amines and process of forming same.—A. H. Stevens. (Sharples Chemicals, Inc.) Feb. 22, 1945. 615,715.

Building constructional elements comprising translucent or transparent units and the method of producing the same.—Soc. Anon des Manufactures des Glaces et Produits Chimiques de St. Gobain, Chauny & Cirey. June 2, 1944. 615,894.

Preparation of manganese dioxide.—S. Chatterjee. Aug. 18, 1944. 615,980.

Resin emulsions.—J. J. V. Armstrong. (Shawinigan Chemicals, Ltd.) Aug. 23, 1945. 615,723.

Manufacture of 2-substituted furane-3:4-dicarboxylic acids and their corresponding tetrahydrofuran compounds.—K. Hofmann. Sept. 25, 1942. 615,901.

Method and apparatus for packaging thermoplastic fibres.—Owens-Corning Fibreglass Corporation. Feb. 14, 1945. 615,733.

Process for refining textiles.—C. Bener. Jan. 8, 1945. 615,741.

Manufacture of furane derivatives.—K. Hofmann. Jan. 3, 1946. 615,908.

Manufacture of tetrahydrofuran derivatives.—K. Hofmann. Nov. 24, 1943. 615,909.

Curing of hydrocarbon copolymers.—J. C. Arnold. Jan. 15, 1946. 615,984.

Method for building up polymerisation products in a mould.—Chemische Fabrik Schenkerwerd H. Erzingen A.G. Jan. 24, 1945. 615,985.

Concentration of vitamins.—Pittsburgh Plate Glass Co. Oct. 31, 1945. 615,914.

Fluid pressure means for controlling the gas valves of gas-fired water-heaters.—A. Peet. April 30, 1946. 615,923.

Colour-comparison sorting machines.—E. H. Bickley. Aug. 8, 1945. 615,996.

Means for controlling the flow of liquids.—C. H. Segrave, T. B. Glynn-Williams, and H. R. Barker. May 14, 1946. 615,997.

Device for dispensing liquid in drops.—C. Bernabo. July 24, 1946. 615,762.

Creping of textile fabrics.—British Celanese, Ltd. Aug. 2, 1945. 616,005.

Portable device or appliance for producing and delivering heated air or fluid.—C. R. Segrave, T. B. Glynn-Williams, and H. H. Barker. Aug. 8, 1946. 616,008.

Means for measuring the temperature of fluids-in-flow.—C. R. Segrave, T. B. Glynn-Williams, and H. H. Barker. Aug. 8, 1946. 616,009.

Imidazolido thiophanes and method of preparing same.—Lederle Laboratories, Inc. Aug. 14, 1945. 615,798.

Manufacture of heat-hardening coating compositions.—L. Berger & Sons, Ltd., L. E. Wakeford, F. Armitage, and D. H. Hewitt. Aug. 8, 1946. 615,802.

Production of gas from oil.—Gas Light & Coke Co., M. Maccormac, and C. H. Lewis. Aug. 9, 1946. 615,807.

Apparatus for the treatment of water and other liquids.—R. H. Froude. Aug. 12, 1946. 615,821.

Tanks for gases or liquids.—L. J. Dubois. July 3, 1942. 615,828.

Tanks for gases or liquids.—L. J. Dubois. Oct. 2, 1942. 615,829.

Adhesive-moisteners.—A. Scheitlin. Sept. 6, 1945. 615,831.

Colouration of polyvinyl plastics.—Geigy Co., Ltd., H. Jones, and C. Musgrave. Aug. 14, 1946. 615,835.

Manufacture and application of textile treatment agents.—I.C.I., Ltd., W. Baird, T. Barr, and A. Lowe. Aug. 14, 1946. 615,838.

Measuring the rate-of-flow of particulate solids through vessels.—I.C.I., Ltd., R. J. Morley, and S. F. Weston. Aug. 14, 1946. 615,769.

Desulphurisation of gases or vapours.—I.C.I., Ltd., P. W. Reynolds, D. M. Gurdings. Aug. 14, 1946. 615,770.

Process for isolating vanillin.—Roche Products, Ltd. Oct. 15, 1945. 615,772.

Manufacture of riboflavin.—Roche Products, Ltd., A. R. Moss, and R. Klein. Aug. 15, 1946. 615,847.

Process of providing magnesium and its alloys with a protective surface coating against corrosion. K. G. Hagg, and A. U. Tragardh. Aug. 15, 1946. 615,848.

Diazotype light-sensitive layers.—C. Bruning Co., Inc. Sept. 7, 1945. 615,774.

Liquid measuring and dispensing apparatus.—Avery-Hardoll, Ltd., and J. Fraser. Aug. 15, 1946. 615,776.

Method of regenerating vulcanised copolymers.—Wingfoot Corporation. April 13, 1946. 615,865.

Coagulation of natural rubber latex.—Wingfoot Corporation. March 13, 1946. 615,866.

Spraying apparatus for applying liquid coatings.—L. Berger & Sons, Ltd (Sherwin-Williams Co.) Aug. 16, 1946. 615,869.

Production of polyvinyl derivatives.—I.C.I., Ltd., R. R. Lyne, and A. W. S. Clark. Aug. 16, 1946. 615,778.

Manufacture of magnesium hydroxide.—British Pericase Co., Ltd., W. C. Gilpin, and N. Heasman. Aug. 19, 1946. 615,782.

Process and apparatus for hydrating, cutting and disintegrating cellulose fibres.—Lyddon & Co., Ltd., and W. J. Nicol, Jun. Aug. 20, 1946. 615,881.

Adhesive compositions.—B. B. Chemical Co., Ltd., L. E. Puddefoot, and A. M. Hall. (B.B. Chemical Co.) Aug. 21, 1946. 616,026.

Butt-welding of aluminium or magnesium or alloys of these metals.—Almin, Ltd., and H. G. Warrington. Aug. 21, 1946. 615,790.

Purification of cellulose products.—British Celanese, Ltd. (Celanese Corporation of America.) Aug. 21, 1946. 616,033.

CHEMICAL LEADWORK

TANKS — VATS — COILS — PIPEWORK

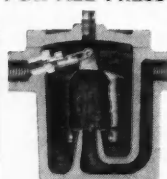
W. G. JENKINSON, LTD.

156-160, ARUNDEL STREET,
SHEFFIELD

Telephone : Sheffield 22473

Specialists In
Carboys, Demijohns, Winchester
JOHN KILNER & SONS (1927) LTD.
Tel. WAKEFIELD 2042 Established 1867

STEAM TRAPS FOR ALL PRESSURES AND DUTIES



WE SPECIALISE
IN ENGINEER'S
REQUIREMENTS FOR
THE CHEMICAL AND
ALLIED TRADES

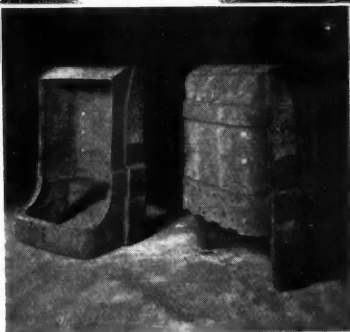
**BRITISH STEAM
SPECIALTIES LTD**
WHARF ST. LEICESTER

Stocks at : London, Liverpool, Bristol,
Whiston, Glasgow, Manchester, & Newcastle-on-Tyne

FABRICATION IN STEEL



The photograph on the right shows excavator drag-line buckets of combined welded and riveted construction.



No fabrication problem comes amiss to **WIDNES CONSTRUCTIONAL DEPARTMENT**. The same skilled hands and flexible organisation which turned to the building of Bailey Bridges and Mulberry Harbour are now once again producing Storage Tanks, Condensers, Coolers, Girder Assemblies, Frames, and the like.

Developed in logical parallel with the production of special-purpose castings, fabrication in steel makes still more comprehensive the engineering service offered by the **WIDNES** organisation.

★ **WIDNES FOUNDRY** are specialists

in the production of cast and fabricated vessels and equipment in cast irons, mild and stainless steels for the **CHEMICAL, OIL, FOOD and ALLIED INDUSTRIES**

WIDNES

FOUNDRY & ENGINEERING

TELEPHONE **CO. LTD** TELEGRAMS
WIDNES 2251(4 LINES) FOUNDRY WIDNES

LUGSDALE ROAD • WIDNES • LANC.

London Office: **BRETENHAM HOUSE, LANCASTER PLACE, STRAND, W.C.2.**

CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

Great Possibilities for QUALIFIED CHEMICAL ENGINEERS

VAST and far-reaching developments in the range of peacetime productions and markets of the Chemical Industry mean that the profession of Chemical Engineering will be of great importance in the future and one which will offer the ambitious man a career of outstanding interest and high status. The T.I.G.B. offers a first-class training to candidates for the Chemical Engineering profession.

Enrol with the T.I.G.B. for the A.M.I.Chem.E. Examinations in which home-study students of the T.I.G.B. have gained a record total of passes including—

FOUR "MACNAB" PASSES

and

THREE FIRST PLACES

Write to-day for the "Engineers' Guide to Success"—free—containing the world's widest choice of Engineering courses—over 200—the Department of Chemical Technology, including Chemical Engineering Processes, Plant Construction, Works Design and Operation, and Organisation and Management—and which alone gives the Regulations for A.M.I.Chem.E., A.M.I.Mech.E. A.M.I.E.E., C. & G., B.Sc., etc.

THE TECHNOLOGICAL INSTITUTE OF GREAT BRITAIN

219, Temple Bar House, London, E.C.4

SITUATIONS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive, or a woman between the ages of 18 and 40 inclusive, unless he or she is exempted from the provisions of the Control of Engagement Order, or the vacancy is for employment exempted from the provisions of that order.

APPLICATIONS are invited by the Ministry of Supply for the following appointment in the Division of Atomic Energy (Production) at Springfields Factory, Salwick, nr. Preston, Lancs.

Managing Chemist to take charge of the Metallurgical development Laboratories at the above factory. Candidates must have either an honours degree in metallurgy, engineering, chemistry, physics, or chemical engineering, or have associateship of the Royal Institute of Chemistry, the Institution of Metallurgists, or the Institute of Physics, and at least three years experience in a factory or industrial laboratory; or have corporate membership of the Institution of Chemical Engineers. Alternatively, they should either be corporate members of the Institutions of Civil, Mechanical or Electrical Engineers, or have passed examinations recognised by any of these Institutions as granting exemption from sections A and B of their examinations for associate membership. Applicants must be capable of directing staff in the experimental metallurgy involved in the development of production processes. Experience in the following fields is desirable—corrosion, metal fabrication, welding and joining of metals, high frequency furnace melting of metals and general metallurgical investigations.

Salary will be assessed according to qualifications and experience within the range £907—£1192 per annum.

Candidates will normally be confined to natural born British subjects, born within the United Kingdom or in one of the self-governing Dominions, or parents also born in the United Kingdom or one of the self-governing Dominions.

Applications should be addressed to Staff Section, Ministry of Supply, Division of Atomic Energy (Production), Risley, nr Warrington.

RI. 4891/LP

SITUATIONS VACANT

AN expanding Middle East Oil Company urgently requires an Assistant Engineer to work initially in the London Office and be willing to accept transfer to the Persian Gulf after one year. Should possess B.Sc. Degree in Chemical or Mechanical Engineering. Will be required to assist in duties involving loading and bunkering facilities, oil gas distribution, and other oil control duties. Some experience of these duties essential. Experience in oil bunkers control with docks operating group of the Royal Engineers may be advantageous. Age 25-30. Salary starting £600-£700 per annum according to age and experience. Write, giving brief details, for application form, and quoting LO 133, to Box "P.Y." c/o J. W. VICKERS & Co., LTD., 7/8, Great Winchester Street, London, E.C.2.

BRITISH ELECTRICITY AUTHORITY (South-Eastern Division) ASSISTANT CHEMISTS

APPLICATIONS are invited for the positions of ASSISTANT CHEMISTS at the Southwick "A" Power Station. Applicants should have a sound knowledge of fuel testing, water analysis, or analytical inorganic chemistry and bacteriology. Experience in the investigation of boiler fouling or metallurgical problems of modern power station installations will be an advantage. Salary, £493 per annum in accordance with Class K, Grade 9 of the National Joint Board Schedule.

Forms of application may be obtained by sending a stamped addressed foolscap envelope to the Divisional Secretary, British Electricity Authority, South-Eastern Division, British Electricity House, Lower Ham Road, Kingston-upon-Thames, Surrey.

Application forms, clearly endorsed, must be returned to the above address not later than 2nd April, 1949.

BRITISH ELECTRICITY AUTHORITY (South-Eastern Division)

APPLICATIONS are invited for the positions of ASSISTANT CHEMISTS in the South-Eastern Divisional Laboratory. Applicants should be qualified in Metallurgy or qualified Chemists with experience in fuel testing, water analysis and in the investigation of boiler fouling problems in modern power station installations.

The salary for these positions will be in the range of £534 3s. to £965 8s. per annum, plus 5 per cent London allowance, and is in accordance with the scales for the Divisional Engineering Staff, which are provisional pending the negotiating of final scales with such Organisations as are appropriate.

Forms of application may be obtained by sending a stamped addressed foolscap envelope to the Divisional Secretary, British Electricity Authority, South-Eastern Division, British Electricity House, Lower Ham Road, Kingston-upon-Thames, Surrey.

Completed application forms should be returned not later than the 2nd April, 1949.

APPLICATION is invited for the position of Maintenance Workshops and Installation Engineer for an important Chemical Works, Manchester area. Applicant should not be over 40 years of age, with Engineering Degree, A.M.I.Mech.E., or equivalent. Practical experience in Maintenance, Chemical Plant Erection and Design essential. Position offered is permanent and progressive. Only men of proved ability need apply. Address in first instance, with particulars of qualifications and experience in detail, and salary expected. Box No. 2784, THE CHEMICAL AGE, 154 Fleet Street, London, E.C.4.

ASSISTANT Analyst required for ore and metallurgical analyses in N.W. London laboratory. Write stating age, experience and salary required to Box No. 2782. THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4

SITUATIONS VACANT

PETROCARBON LIMITED require Assistant Mechanical Engineer. The position is a permanent one with an attractive salary and prospects for an applicant with proved technical and practical ability in general engineering, coupled with experience in workshop organisation, management and labour control. Previous experience in chemical plant maintenance would be an advantage. Applications, in the first instance, in writing, to **PERSONNEL MANAGER, Petrocarbon Limited, Partington Industrial Estate, Urnston, Manchester.**

PROCESS Foreman or Superintendent with extensive and practical experience in the manufacture of bleaching powder required by up-to-date chemical manufacturers in India. Three year contract is offered with possibility of renewal. Write stating full details of previous experience, age and qualifications to Box No. 2778, **THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.**

REQUIRED. Three Production Chemists, for training as Shift Supervisors in Chemical Factory. Applicants should possess B.Sc. Degree or equivalent, and should preferably have had some industrial experience. Age group up to 30. Good prospects to right men. Apply, giving full details and salary required, to **THE FULLER'S EARTH UNION, LTD., Patteson Court, Nutfield Road, Redhill.**

TECHNICAL Assistant, with experience in Plastics laboratory work and machine control, required for plant producing plastic insulated cables and mouldings, to assist in the technical control of plasticising and extrusion processes. Commencing salary, £350 per annum. Apply, Works Manager, **PIRELLI-GENERAL CABLE WORKS, LTD., Eastleigh, Hants.**

FOR SALE

MORTON, SON & WARD LIMITED
OFFER—

MIXING PLANT

THREE—200-gal. Unjacketed Open-top Mild Steel Mixing Pans, 3 ft. diam. by 4 ft. 6 in. deep, with overdriven stirring gear, fast and loose pulleys, 2-in. run-off. (New and unused.)

FOUR—40-gal. Steam-jacketed Open-top Welded Mild Steel Mixing Pans, 2 ft. diam. by 2 ft. deep. 50 lb. per sq. in. w.p. with overdriven stirring gear. (New and unused.)

ONE—40-gal. Ditto, copper lined, with bronze propeller-type agitator, arranged overdriven reversing gear.

ONE—200-gal. Enclosed Electrically-heated Mixer, 3 ft. diam. by 4 ft. 6 in. deep galvanised throughout, with overdriven stirring gear. 8 kW. heating, 230 volts, single-phase, 50 cycles. (NEW.)

TWO—150-gal. Enclosed Pressure Mixers, 3 ft. diam. by 3 ft. deep with 1 ft. 6 in. conical bottom, overdriven stirring gear, fast and loose pulleys. (Unused.)

ONE—New and unused Gardner "Rapid" Steam-jacketed Mixer and Drier, 2 ft. 3 in. wide by 2 ft. 6 in. deep by 6 ft. 3 in. long, gear wheel and pinion drive from fast and loose pulleys.

ONE—New "Morward" Dry Powder Mixer, 2 ft. wide by 2 ft. deep by 6 ft. long, inbuilt drive through reduction gearbox from 6 h.p. motor, complete with starter, 400/3/50.

Also

New Mixing Plant, constructed to requirements. Inquiries invited. Prompt delivery.

**MORTON, SON & WARD LIMITED
WALK MILL, DOBROSS, Nr. OLDHAM,
LANCS.**

'Phone : Saddleworth 437.

AIR Compressor, 1 vertical, belt driven, 8-in. cyl. by 6-in. stroke, flywheel and pulley drive. £40. **THOMPSON & SON (MILLWALL), LTD., Cuba Street, London, E.14.**

FOR SALE

GEORGE 600 COHEN'S

ROTARY KILN or CALCINER, 51 ft. long by 7 ft. diam., constructed 4-in. plate with 6-in. brick lining. Drive by 25 h.p. motor. Calciner complete with combustion chamber, twin Prior Stokers, rotary feed table and fan, all motorised.

ROTARY COOLER, 35 ft. long by 4 ft. diam., constructed 4-in. plate. Drive by 7 h.p. motor.

MULTI-TUBULAR DRIER by Simons, size 3C, capacity 4½ tons per hour, with moisture reduction of 10 per cent, using steam at 100 lb. p.s.i. Trough, 12 ft. long by 6 ft. wide by approx. 6 ft. deep. Internal reel of solid drawn steel tubes rotates by ratio of 1 : 4.

MIXER DRIER by Simon. Horizontal unjacketed trough type. Internal dimensions approx. 8 ft. long by 2 ft. 6 in. deep by 2 ft. 8 in. wide. Agitator bank of 16 solid drawn tubes approx. 6 ft. 6 in. long by 2½ in. o.d. 8-in. sq. bottom side discharge. Bottom half of mixer removable.

Bucell (Buttner System) **ROTARY DRYING PLANT,** comprising rotary drier, 34 ft. 6 in. long by 6 ft. 11 in. deep, constructed 4-in. M.S. plate with discharge equipment, fan, dust separator, screw and drag link conveyors, bucket elevators, but excluding electrical equipment.

Patent **Rapid DRYING AND MIXING MACHINE** by Gardner, 8 ft. 6 in. by 2 ft. 6 in. by 3 ft. deep, for belt drive. Fitted extraction fan, 12 ft. of piping, gauge and valve, and V-belt driving pulley.

Duplex **MIXING AND KNEADING MACHINE** by Morton of Wishaw. Steam-jacketed trough, size approx. 42 in. by 38 in. by 30 in. Working capacity, 115 gallons. Fitted twin gunmetal mixing blades double Naben type. Suitable for internal working pressure of 15 lb. p.s.i. or high vacuum.

SEVERAL COMPOUND BALL TUBE MILLS by Wm. Johnson of Leeds. Dimensions approx. 12 ft. long by 3 ft. 6 in. diam., arranged for belt drive through gearings. Complete with charge of flints and steel balls.

TWO—HYDRO EXTRACTORS by Broadbent, 48-in. diam. perforated baskets. Three-point suspension. Steam driven.

GEORGE COHEN SONS & CO. LTD.,

SUNBEAM ROAD, LONDON, N.W.10,

Tel.: Elgar 7222, and

STANNINGLEY, Nr. LEEDS.

Tel.: Pudsey 2241.

CRUSHER, by Harrison Carter, 12 in. by 12 in. by 12 in., with Crofts 3½ h.p. geared motor. £100. **THOMPSON & SON (MILLWALL), LTD., Cuba Street, London, E.14.**

NEW STAINLESS STEEL PLANT
FOR ALL NEEDS

with quick delivery

**Boiling Pans, Tanks of all shapes and sizes
Dyeing and Drying Racks
Stainless Steel Buckets
Steam heated vacuum Driers
Acid resisting enamelled ware**

We also specialise in finding unusual second-hand items for our customers. If you do not receive our Monthly List please let us have your address. We are not dealers but sell plant on commission. May we help you?

R. F. PAGET Ph.D., C.C.I.

Chemical Engineer

Manor House, Barwick-in-Elmet, Leeds

Tel. Barwick-in-Elmet 216

FOR SALE

CHARCOAL, ANIMAL and VEGETABLE, horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD.**, "Invicta" Mills, Bow Common Lane, London, E. Telegrams, "Hilljones, Boeburch, London." Telephone: 3255 East.

DRUM TILTS for 40-gallon drums enable to drain easily and safely. From 55s. each. **W. SHUPAK & CO., LTD.**, 2, Stothard Place, Bishopsgate, London, E.C.2.

GEARED MOTORS, ALL SIZES IN STOCK.

1½ h.p. 200/240v. D.C. Final r.p.m. 50, £35.
¾ h.p. 200/230v. A.C. S/Ph. 50c. Final r.p.m. 52.
£28 15s., etc., etc.

UNIVERSAL ELECTRICAL,
221, City Road, London, E.C.1

*Phone 98 Staines

SET of Rubber or Plastic Rolls, Steam Heated, 16 in. by 9 ft. dia.
Artotex Dough Mixer, 34 in. revolving bowl, electric driven.

Unused "Weir" Tubular Condenser, 140 sq. ft. Jacketed Cylindrical Vacuum Oven, 7 ft. by 3 ft. (unused). 3 ft. 6 in. stainless coated Edge Runner by Torrance. Filter Press, 30 chambers, 26 in. by 26 in.

HARRY H. GARDAM & CO. LTD.
STAINES

SEVERAL small steam-jacketed Copper Pans.

Several Ball Mills, 6 ft. 6 in. by 6 ft. 8 in., Silex-lined batch type, with driving gear and clutch.
3 Simon type Portable Slat Conveyors, 20 ft. long, for boxes or bags.

Mixing Pan, 6 ft. dia. by 5 ft. deep, flat bottom, open top. Ditto, 3 ft. dia. by 5 ft. deep, flat bottom, open top. 2—6 in. Centrifugal Pumps by Cherry.

Milton Grinders fitted with 30 in. vertical stones, belt driven with shaker feeds.

1 Two 20 in. Turbine Centrifugal Extractors with spare baskets.

Steam Jacketed Gardner pattern Mixer about 30 gallons capacity.

4 vertical **Hall Ammonia Compressors**, single cylinder, belt driven cylinders 3 in. to 5 in. bore.

3 **Alfa-Laval Disc Separators**, belt driven, size 45 and 65, with chambers 12 in. and 15 in. dia.

2 unused belt driven **Ram Pumps**, fitted one ram 14 in. dia., 3 in. stroke, brass fitted.

Alpine type Perplex Grinder, chamber 20 in. dia. Ditto similar, chamber 18 in. dia.

Single pair toothed Crushing Roll, belt and gear driven, last used for soap crystals.

2 **Steam Jacketed Mixing Pans**.

Several A.C. motors, 3-10 h.p.
21—3 gallon capacity **Ball Mills**.

4 **Mather & Platt Colloid Mills**.

400 ft. **B.E. Gravity Conveyor**, steel rollers, 14 in. long by 6 in. pitch.

Torrance Positive-geared Edge Runner Mill.

Torrance Combination Mill, comprising edge runner, horizontal pug, and granite roller mill.

5 **Riveted Vessels**, partly jacketed and plain, with agitators and coils, as used in oil-refining trade.

3 **Miracle Super Hammer Mills**, size 3W, each with 65 H.P. A.C. Motor, vee rope drive, cyclone, fan and all belongings.

4 Various **Werner Pfeider Mixers**, size 16 and 17, double 'Z' arms, both plain and steam jacketed types.

Gardner Rapid Sifter Mixer, 4 ft. long.
Gardner 10 ft. steam jacketed Dryer.

Write: RICHARD SIZER LIMITED, ENGINEERS
CUBER WORKS HULL

1000 STRONG NEW WATERPROOF APRONS.

To-day's value 5s. each. Clearing at 30s. dozen. Also large quantity Filter Cloths, cheap. Wilsons. Springfield Mills, Preston, Lancs. Phone 2198.

FOR SALE

BLAIR CAST-IRON SINGLE ROLLER DRUM DRIER, with 2 ft. 6 in. diam. by 7 ft. 3 in. long drum fitted into cast-iron vacuum tight casing. Complete with Crofts variable speed gear, 12½ h.p. motor and liquid feed pump.

SIMON TWIN ROLLER DRUM DRIER, with steam-heated rolls, 2 ft. 4 in. diam. by 3 ft. long; drive through spur gearing with countershaft and complete with fast and loose pulleys.

DITTO by "Milne."

BROADBENT 48-in. SUSPENDED TYPE HYDRO EXTRACTOR, overdriven from 15 h.p. motor, 400/350 supply, together with Pony motor for slow running.

BROADBENT 48-in. HYDRO EXTRACTOR, with 48-in. galvanised iron basket, complete as above.

JOHNSON TIMBER PLATE AND FRAME FILTER PRESS, 28 plates and 29 frames, cakes 2 ft. 1 in. sq. by 1½ in. closure. (Two available.)

18-in. diam. **WILKINSON OINTMENT MILL**, with marble refining discs and enamelled hopper and agitator, and complete with driving motor.

TUNGSTONE ACID PUMPS. A number available in Ebonite, Bronze and Tufnol.

SILICA COILS of 2½ in. bore, comprising 60 ft. formed into seven turns at 2 ft. 6 in. diam., complete with teak supporting framework. (Brand new.)

NEWMAN INDUSTRIES LIMITED,
YATE, BRISTOL.

180 Brand New Chestnut Barrels, 44 gallons, available immediately. Price 40s. delivered **ROBERTI & CO., WARTON, CARNFORTH.**

1,500-GALLON Totally Enclosed Stainless Steel Storage Vessels with coned base and 2-in. flanged outlet. Mounted on mild steel legs.

500-gallon S/S Vertical Open-top Storage Vessels, cylindrical, with coned base and 2-in. flanged outlet. Mounted on mild steel legs.

100-gallon Hot Water Jacketed Mixing Vessel, fabricated from stainless steel and complete with insulation.

Fitted with gate-type agitator and driven from 2 h.p. motor through reduction gear. Suitable for 400 v./440 v., 3-phase, 50 cycles, complete with lid and provided with gas burner underneath.

8-gallon Stainless Steel Containers, 13-in. diam. by 17 in. deep, fully welded throughout and interior dull polished, exterior decaled. Vessels complete with lids.

80-gallon Gross Capacity Stainless Steel Stationary Boiling Pans, suitable for working pressure of 50 lb. per sq. in.

50-gallon Gross Capacity Stainless Steel Stationary Boiling Pans, suitable for working pressure of 60 lb. per sq. in.

90-gallon Stainless Steel Evaporating Pan with mild steel jacket, suitable for working pressure of 15 lb. per sq. in. Internal welds ground smooth, exterior welds chipped clean.

Full particulars from **A. JOHNSON & CO., (LONDON), LTD., Dukes Road, Acton, W.3.**

ROTARY VACUUM FILTER

Drum cell type. 4 ft. 7½ in. diameter × 2 ft. 7½ in. wide. Filter surface 35 sq. ft. 2 h.p. 4-speed motor with starter. Makers, International Combustion Co., Ltd. Brand new condition £1,350

RYLATT & CO.,

64 Fountain St., Manchester

TELE: BLACKFRIARS 9956

FOR SALE

CYLINDRICAL STORAGE TANKS

4,000 Gallons capacity, 17 ft. 3 in. long by 7 ft. 2 in. diam. totally enclosed, of welded construction from $\frac{1}{2}$ in. M.S. plate with dished ends. Fitted with 18-in. diam. manhole and internal strengthening baffles. In excellent condition, complete with 2-in. diam. inlet and 2-in. diam. vent cocks.

COX & DANKS LTD.,
Plant and Machinery Dept.,
BROADHEATH, Nr. MANCHESTER.
Phone: Altrincham 3711.

SERVICING

DOHM, Ltd., pulverise raw materials everywhere,
167, Victoria Street, London, S.W.1.

GRINDING, Drying, Screening and Grading of materials undertaken for the trade. Also Suppliers of Ground Silica and Fillers, etc. **JAMES KENT, LTD.,** Millers, Fenton, Staffordshire. Telegrams: Kenmill, Stoke-on-Trent. Telephone: 4253 and 4254, Stoke-on-Trent (2 lines).

GRINDING of every description of chemical and other materials for the trade with improved mills.—**THOS. HILL-JONES, LTD.,** "Invicta" Mills, Bow Common Lane, London, E. Telegrams: "Hilljones, Bochurch, London." Telephone: 3285 East.

LONDON FIRM offers complete service packing powders of all descriptions, also liquids and chemicals. Long runs only. Containers and packing cases for home and export, made on premises. Near to docks. Own rail sidings. Box No. 2331, **THE CHEMICAL AGE**, 154, Fleet Street, London, E.C.4.

MACHINERY Installations—try **R. A. COLLACOTT & PARTNERS**, 70, Victoria Street, London, S.W.1. (VICTORIA 0179/9771).

WANTED

ANY kind of Merchandise bought for cash. Govt. surplus, redundant stocks, job lines, anything. Write **G.T.C. 82/94**, Seymour Place, London, W.1.

RUBBER or other suitably lined Vessels required urgently for storage of hydrochloric acid up to 20,000 gallons. Write Box No. 2783, **THE CHEMICAL AGE**, 154, Fleet Street, London, E.C.4.

WORKING NOTICE

THE Proprietor of the Patent No. 513604, for "Improvements in or relating to Alloying Molybdenum with Ferrous Metals," are desirous of entering into arrangements by way of licence and otherwise on reasonable terms for the purpose of exploiting the same and ensuring its full development and practical working in this country. All communications should be addressed in the first instance to **HASELTINE LAKE & Co., 28, Southampton Bldgs., Chancery Lane, London, W.C.2.**

AUCTIONEERS, VALUERS, Etc.

EDWARD RUSHTON, SON AND KENYON
(Established 1805).

Auctioneers' Valuers and Fire Loss Assessors of
**CHEMICAL WORKS, PLANT AND
MACHINERY**

York House, 12 York Street, Manchester.

Telephone 1937 (2 lines) Central, Manchester.

SURPLUS RE-CONDITIONED CHEMICAL PLANT & MACHINERY

for

IMMEDIATE DELIVERY

State your requirements

to

**HODSON
& CO. (MACHINERY) LTD**
TOTTINGTON · BURY · LANCS

PHONE: TOTTINGTON
123

Lennox Foundry Co. Ltd.

*Specialists in non-ferrous
Castings for the Chemical
Industry*



Glenville Grove, London, S.E.8

Decolorising **CARBON**

ALL GRADES
FOR
ALL TRADES

**HIGHEST EFFICIENCY
LOWEST PRICES**

**Granular Carbon for Solvent Recovery.
Regeneration of Spent Carbon.**

Write for samples and quotations.

FARNELL CARBONS LIMITED
CONDUIT ROAD, PLUMSTEAD, LONDON, S.E.18

Telephone: Woolwich 1158 (2 lines).

Telegrams: Scofar, Wol, London.

"LION BRAND" METALS AND ALLOYS

MINERALS AND ORES

RUTILE, ILMENITE, ZIRCON,
MONAZITE, MANGANESE, Etc

**BLACKWELL'S
METALLURGICAL WORKS LTD.**

GARSTON, LIVERPOOL, 19

ESTABLISHED 1869

Wanted

by **R. A. Collacott & Partners
CHEMICAL ENGINEERS**

your enquiries for

- ★ Machinery Installation
- ★ Special Machines
- ★ Geared Motors
- ★ Machine Repairs, Overhauls, etc.
- ★ Structural Steelwork
- ★ Rolling Mills, etc.

R. A. Collacott & Partners
70 Victoria St., London, S.W.1

Telephone: VICTORIA 0179 or 9771

B.S.S. 334

**CHEMICAL
SHEET LEAD**

**CHEMICAL
LEAD PIPE**

COX BROS. & CO.

(DERBY) LTD.

LEAD WORKS, DERBY

And at Nottingham

Mirvale



Cresylic Acid

**CRESOLS, PHENOL
HIGH BOILING TAR ACIDS
CRESYLIC CREOSOTE
NAPHTHALINE, PYRIDINE**

MIRVALE CHEMICAL CO. LIMITED
MIRFIELD, YORKS. Phone Mirfield 2157

The FLOOR of AGES

RESISTS ACIDS AND ALKALIS

INSTALLED by a variety of industries for its rock-like permanence, The Floor of Ages also adds acid and alkali resistant to its honours. And rightly so. Exacting practical tests prove conclusively that The Floor of Ages is an effective, permanent resistant that is saving time and money for leading firms at home and abroad.

If you would like to know how The Floor of Ages can solve YOUR problem, simply write or phone our Technical Dept.

TANK LININGS

Bolton & Hayes are specialists in linings for bleaching cisterns,



formaldehyde storage tanks, and acid and alkali vats, etc.

BOLTON & HAYES LTD.

VIKING HOUSE
Manchester Road, Bolton Tele. 4067

CALLOW ROCK

Gas-Burnt

LIME

for all purposes

• • •

QUICKLIME

(Calcium Oxide)

of the highest commercial quality, in lumps or in coarse powder form

HYDRATED LIME

(Calcium Hydroxide)

In Standard and Superfine grades to meet most industrial requirements

• • •

The Callow Rock Lime Co. Ltd
CHEDDAR Somerset

Agents: DURHAM RAW MATERIALS, LTD.,
1-4, Great Tower Street, LONDON, E.C.3.

ACID-PROOFING

EXPERTS

FOR
FLOORS - CHANNELS -
TANKS (storage & process) -
DRAINAGE - NEUTRALISING -
CHIMNEY and TOWER
LININGS (chemical)



Est.


22 Years

HEAD OFFICE and WORKS:
WEDNESBURY, STAFFS.
Telephone: 0284 (5 lines)

London Office: Artillery House,
Artillery Row, S.W.1. (Abbey 1547-8)

ACID-PROOFING

**SPECIALISTS
IN HIGH-GRADE
REPETITION WORK
IN ALL METALS**



THE CASTLE ENGINEERING
COMPANY (NOTTINGHAM) LIMITED
HASLAM STREET • CASTLE BOULEVARD • NOTTINGHAM
Telephone: Nottingham 46068 (3 lines) Telegrams: 'Capston', Nottingham

"STILL LEADING"
For CHEMICAL & ALLIED TRADES
ACID RESISTING
CEMENTS & LININGS

**For PICKLING TANKS, FLOORS,
DIGESTERS, KIERS,
STONE, CONCRETE,
BRICK, WOOD,
IRON VESSELS
& ACID
TOWERS**

PICKLING TANKS 60 FEET LONG WORKING SUCCESSFULLY

RIZISTAL

AN ALL BRITISH PRODUCT

SOLE MAKER

JOHN L. LORD
WELLINGTON CEMENT WORKS
BURY, LANCASHIRE

TELEGRAMS: "CEMENT"
PHONE: BURY 617

RESISTS
Formaldehyde,
Alcohol, Oils, Greases
and Tar Acids, Benzene,
Toluene Compounds HCl,
H₂SO₄, HNO₃, and H₃PO₄,
mixed HNO₃ and HF Acids,
Aqua Regia, Formic, Acetic, Lactic,
Oxalic, Chromic Acids, Bisulphites,
Hypochlorites, Mixed Acids, Peroxides,
Nascent Halogens and Alkalies.
UNDER STEAM PRESSURES
OVER 50 YEARS' EXPERIENCE



